state & society

Hinners of NASA looks ahead to the Spacelab era

Space science, an "inherent component" of the National Aeronautics and Space Administration's mission, will get a big boost when the Space Shuttle begins carrying experiments aloft on a routine basis, according to Noel W. Hinners, NASA's Associate Administrator for Space Science. Hinners discussed with us the role of scientific research within the space agency and the new problems and programs he expects the Spacelab era to bring. In the use of Spacelab, he looks forward to a shift in NASA's approach to space-science activities, toward more discipline- rather than mission-oriented research and greater responsibility for academic and industrial scientists in the design and operation of space experiments; however, he told us he views as premature at this time suggestions that the agency establish a special x-ray-astronomy institute to coordinate research in that field.

Hinners holds responsibility for NASA's Physics and Astronomy, Lunar and Planetary, and Life Sciences Programs. Before he became Associate Administrator in June 1974, he served as deputy director and then director of Lunar Programs, where his domain included continuing scientific exploration of the Moon, analysis and interpretation of lunar data and planning for future missions. In 1963 Hinners earned his PhD in geochemistry and geology at Princeton University; he then joined Bellcomm, where he headed the lunar-exploration department. Hinners edits an American Geophysical Union journal, *Geophysical Research Letters*.

Role of space science. The part played by scientific research in space—as distinguished from the scientific and engineering R&D associated with the Apollo project, the Space Shuttle and so forth—has been much obscured, Hinners acknowledged, by such NASA spectaculars as the race for the Moon. But he told us that the objectives of the space-science program (which was written into NASA's charter, the Space Act of 1958) are essentially unchanged, in the large scale, from what they were in the 1960's, and he is pleased with the agency's support for the science effort. "There's no doubt," he said, "that the main funding now is for the Shuttle, and other programs—such as Aeronautics Applications and Space Technology—compete with us for recognition, but I'm very happy; in view of the external constraints, I think space science is receiving internally from NASA all the support it should and could."

A NASA study on the "Outlook for Space" over the next 25 years, released this year after long delay, sets as agency priorities improved understanding of Earth's climate and of the evolution of our solar system (see PHYSICS TODAY, June

continued on page 72

HINNERS

ERDA plans to close Argonne ZGS two years hence

The Zero Gradient Synchrotron at Argonne National Laboratory will almost certainly be shut down at the end of 1978 or shortly thereafter, according to James S. Kane, director of ERDA's Division of Physical Research. The primary reason cited for the facility's termination is the tight funding situation for high-energy physics. The 1976 ZGS Review Panel, headed by Robert L. Walker (California Institute of Technology), concludes in its report that most of the ZGS program could end two years from now, but that its unique polarized-proton-beam capabilities should continue to be exploited for an extra nine months operating time. A proposal to ERDA from Argonne seeks to have the ZGS's life extended even further, as a dedicated polarized-proton accelerator.

Kane told us the fate of the ZGS is not in doubt—the only question is one of timing. "We see little chance," he said, "that the Argonne facility could continue beyond the Walker panel's recommended time limit." William Wallenmeyer, head of the high-energy physics program within Kane's division, enlarged upon ERDA's outlook: A definite schedule for the shutdown, he said, depends in part on the recommendations of the High-Energy Physics Advisory Panel. (HEPAP was to consider the ZGS question at a 29 November meeting at SLAC.) The motivation of closing down the Argonne synchrotron, he told us, is an economic one; ERDA wishes to go ahead with the building of new high-energy facilities, such as PEP at Stanford, and the budget for high-energy physics—measured in constant dollars—has been shrinking since 1968. One of the present facilities, therefore, must be terminated, according to Wallenmeyer, and the 12-GeV ZGS is the lowest-energy accelerator in the program.

Argonne's weak-focusing synchrotron began full intensity operation in 1967, and the polarized-proton-beam work commenced in 1973. Beam intensity in the polarized mode is now 2×10^{10} protons/pulse and is expected to reach 5×10^{10} protons/pulse.

The Walker plan. The nine-member Walker panel, most of whom also served on the physics subpanel of the 1974 ZGS Study Committee (sponsored jointly by the President's science adviser and AEC) has produced a plan for the optimal utilization of the ZGS during its remaining lifetime. The panel proposes the following allocation of time for the ZGS program's three major components:

White House

continued from page 70

tion and organization of the OSTP—to aid White House science adviser H. Guyford Stever. Stever has charged Nierenberg with reviewing energy issues and ocean-related matters, while Kennedy is expected to look into basic research in agriculture, DNA-research guidelines and the report of the President's Biomedical Research Panel.

Nierenberg, with a PhD from Columbia University, served as a professor of physics at the University of California, Berkeley, until in 1965 he became director of the university's Scripps Institution of Oceanography in San Diego; he is a member of the National Science Board. Kennedy received his PhD from Harvard, was on the zoology faculty at Syracuse University from 1956 to 1960, and now heads Stanford University's Program in Human Biology. —FCB

Hinners

continued from page 69

1976, page 69). We asked Hinners if these are in fact the chief concerns within the space-science operation. He told us that priorities have not been set among astronomy, astrophysics, solar–terrestrial research and so on; instead, he favors the continuation of a broad effort that investigates each of those areas as much as the program's resources allow. Even if a budget cut forced the setting of more definitive priorities, Hinners said, "You wouldn't, I think, see the disappearance of a particular component of the research program . . . ," but rather a general winding down, with some individual flight missions cancelled. He predicted that if this occurred, within five to ten years the lack of new data to work with would result in people's wandering off to other fields and the dying out of the space-science effort. He agrees with the "Outlook's" call for space-science funding at a level of $500–600 million per year, up from the current $400-million base.

The only "new start" in the Physics and Astronomy Program's FY 1977 budget was the Solar Maximum Mission, Hinners told us, and the Pioneer-Venus mission was the last new start funded in planetary exploration. The Large Space Telescope, a 2.4-meter optical telescope intended to be placed in orbit by the Space Shuttle, was originally expected to be another FY 1977 new start, but it failed to win any funding this year. "To do some of the thing's we're thinking about—such as the LST and further outer-planets missions—requires a space-science budget well above the present level," said Hinners. The space telescope and a Jupiter-Orbiter mission, he said, are potential new starts in FY 1978.

Space Shuttle's promise. Hinners expects the space-science program to be a prime user of the Shuttle in the 1980's. Indeed, without the guaranteed easy access to Earth's near-space environment offered by the Space Shuttle, he said, contemplated projects like the LST would make little sense: "We want to avoid having to design everything with the idea it'll work for ten years without fail; we're counting on being able to bring experiments back for maintenance and refurbishing and to change them when we want to look at different phenomena." The space telescope, for example, would lose much of its value, he told us, if it were launched into orbit by a one-shot Titan rocket; the opportunity to repair and readjust the observatory at intervals, made possible by the Shuttle, is vital.

Life-sciences research and the Atmospheres, Magnetospheres and Plasmas-in-Space payload are identified by Hinners as the most important space-science investigations for the near term to be carried out in the Spacelab, an orbital laboratory carried in the bay of the Shuttle. In the Spacelab's free-fall environment, long-term effects in humans, animals and bacterial cultures will be studied, while the AMPS payload is expected to make possible the first "active" experiments in Earth's near-space zone. Electron accelerators and high-power transmitters will constitute part of the apparatus hoisted aloft. "We're also looking," Hinners told us, "at a number of astrophysics, stellar-astronomy and solar-physics payloads" for the Spacelab, employing active sounding techniques in atmospheric physics and laser-lidar ("light detection and ranging") systems in measuring trace constituents.

New approaches. The new breed of space-science projects to be made available by the Space Shuttle's use has led to the consideration of new ways of soliciting experiments and sharing responsibility with the scientists collaborating with NASA. In the near future, according to Hinners, NASA will begin calling for ideas and proposals without reference to particular flight missions. "We'd fund the experimenter and his research now," Hinners said, "and then a few years downstream, say six months or so before he's ready to fly, he'd notify us and we'd schedule his experiment on a regular shuttle flight." Such an approach, he said, would result in less launchdate-inspired panic, reduced costs and possibly better-thought-out research.

Experimental apparatus on the Spacelab is to be mounted on removable structures called pallets, which slip into the bay of the Space Shuttle. Hinners told us "dedicated pallets" are under consideration. "It's conceivable," he said, "that these could be farmed out to university groups, consortia, or whatever, so they could put together their own pallets; this would put the burden of making sure the experiments work on them."

Go-slow on institute. Special institutes for the LST and for x-ray astronomy have very recently been proposed to NASA as a means to bring space scientists in those areas together, originate ideas for research and coordinate experimental programs. Hinners told us an LST institute is under consideration, because the space telescope would be an exceptionally long-term project (10–15 years) for the agency, and the space-science staff recognizes the need for special handling in that case. As for establishing an x-ray-astronomy institute, though, he discounts any current necessity. Not only is there no x-ray satellite now flying (or planned) that would have a lifetime comparable to the space telescope, Hinners told us, but also NASA wishes to move slowly on the institute approach. "Institutes," he said, "tend to proliferate, and once they're set up they tend to be cast in concrete." He added that an LST-like orbiting x-ray observatory is contemplated for the 1980's, and when that time comes an institute might be desirable—now it would be premature. —FCB

New officers elected for National Academy

Emanuel R. Piore, retired vice-president and chief scientist and a current member of the board of IBM Corp, has been re-elected to a third four-year term as treasurer, National Academy of Sciences.

Also elected were four new members of the Council of the NAS—among them is Philip W. Anderson of Bell Laboratories, Murray Hill, N.J., who began his three-year term 1 July.

in brief

The American Association for the Advancement of Science has announced that internships are available for up to 18 advanced natural and social science students, who would serve as reporters, researchers and production assistants in a variety of media areas during the summer of 1977. Applications should be sent by 1 February 1977 to Coordinator, AAAS Mass Media Intern Program, 1776 Massachusetts Avenue NW, Washington, D.C. 20036.

The Third Marconi International Fellowship will be awarded for "creative work in communications and electronics that will benefit mankind." Previous recipients have been James R. Killian Jr (Massachusetts Institute of Technology) and Hiroshi Inose (University of Tokyo). Nominations for this $25 000 Fellowship should be sent to Marconi International Fellowship Council, Aspen Institute for Humanistic Studies, 1919 14th St, No. 811, Boulder, Colo. 80302. □