state & society

Frosch sees period of evolutionary exploration for NASA

President Jimmy Carter and his White House staff may still harbor serious doubts about such major NASA commitments as the Space Shuttle, according to Robert A. Frosch. Frosch, the newly confirmed Administrator of the National Aeronautics and Space Administration, told us in a recent interview that it is his aim to shift the space agency away from "space-for-its-own-sake" endeavors toward greater emphasis on applications and scientific investigation; he sees such a shift as in harmony with the Carter Administration's preferences and as a continuation of present trends within NASA. Manned exploration efforts and human habitation in space would not cease with such a policy, he said, but would probably proceed in a more "evolutionary" manner rather than through "space spectaculars."

NASA's budget fared well in Congress after initial worries. Earlier this year the House, following the recommendation of Congressman Edward Boland's (D-2nd CD, Mass.) House Appropriations Subcommittee on HUD and Independent Agencies, had caught NASA by surprise with its deletion of funds for the Jupiter Orbiter–Probe project, one of the agency's two "new starts" for the 1978 fiscal year. But all came out well for the JOP project

FROSCH

(whose total cost is estimated at $285 million) when its initial $20.7-million appropriation was approved in both houses of Congress after a House-Senate conference. The Space Telescope, a 2.4-meter optical telescope to be placed in orbit above the Earth's obscuring atmosphere when the Space Shuttle is operational, is NASA's other new start for FY 1978; Congress granted $36 million in start-up funds for the $435–470-million instrument with little dispute (see PHYSICS TODAY, April, pages 18 and 71).

Frosch, who has a PhD in theoretical physics from Columbia University, joined Columbia's Hudson Laboratories in 1951 as a research scientist and became director in 1956. From 1963 to 1966 he was employed by the Department of Defense's Advanced Research Projects Agency, where he reached the position of deputy director. He then served as Assistant Secretary of the Navy for Research and Development (1966–1973) and as Assistant Executive Director of the United Nations Environment Program (1973–1975) before becoming Associate Director for Applied Oceanography at the Woods Hole Oceanographic Institution, a post he held until he was selected to head NASA.

Midcourse corrections for NASA. "I think probably they have lots of questions still," Frosch told us, referring to the White

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AIP will ask authors to transfer copyright under new law

The American Institute of Physics, along with other scientific publishers, has revamped its policies and procedures in anticipation of the new US copyright law (*General Revision of the Copyright Law, Title 17 of the United States Code*), becoming effective on 1 January 1978. Perhaps the most significant change in AIP's publishing policies is that a formal written transfer of copyright, from an author to AIP, will be required for each article in AIP-owned journals. Similar policies are being adopted by member societies of AIP, and organizations such as the American Chemical Society and the Institute of Electrical and Electronics Engineers are in the process of developing new copyright policies along the same lines. (For a description of the situation created by the new copyright law and a discussion of the transfer of copyright required by AIP, see the Editorial on page 104.)

Out with the old. Under the old law (established in 1909), there were two separate copyrights: One was a "common-law copyright" for unpublished articles, and the other was copyright applicable to published works. Copyright was established when a publisher registered his copyright with the US Copyright Office. The new law does away with this distinction between published and unpublished works by establishing copyright at the time a work is created; therefore, copyright is initially vested in the author. Consequently, legal procedure requires that a transfer of copyright from the author to a publisher must be obtained in writing.

In the past most publishers of scientific journals have regarded this transfer as an implicit assumption upon manuscript submission, although some publishers, such as the American Psychological Association, have required a written transfer for many years. To continue operations of marketing, sales and reprint permissions, publishers now must obtain this transfer in writing at the time of submission.

Need for transfer. According to H. William Koch, director of the American Institute of Physics, when an author transfers his copyright to a scientific-society publisher such as AIP, he is transferring his rights to his *collective* colleagues—the same people who have participated in the development of standards for peer review and, in general, influence the way in which

- Translation journals and rights, available to foreign-language publishers,
- Computer tapes of abstracts and titles, available to abstracting and indexing services, and
- Reprint books and republishing rights, available to reprint-book publishers (subject to author's permission).

Payment for reprints and royalties from republication are always received by the journals.

Problems for industry. The new copyright law specifies that photocopying done by an institution operated for commercial advantage is subject to greater restrictions than photocopying done by academic institutions.

The industrial community has been particularly interested in a clear delineation of publishers' policies on reproduction of scientific articles since the passage of the new law. Publishers in general have been urged by libraries of industrial organizations, including those of AIP Corporate Associates, to establish procedures that would permit them to photocopy as they have in the past.

Clearance center. In July a group of technical, scientific and medical publishers incorporated a copyright-clearance center, which is intended to serve as a clearinghouse for money paid and received for photocopied articles (copied for reasons other than fair use). This center, which will operate on a non-profit basis, is the result of a proposal by the Association of American Publishers with the participation of AIP, IEEE, and the ACS among others. The center will be of particular assistance to industrial laboratories.

Koch, who is one of the five founding members of the board of directors, explained to us the system that will be used: When an article is copied, an extra copy of the first page of an article is made and sent as a "coupon" to the clearance center. In turn, the center tallies these coupons and bills the user. Koch contends that this system will substantially lower order-processing costs and, as more and more recopying is done, the income lost in lowered subscription numbers (cover-to-cover editions of journals) will be replaced by sales and fees for individual journal articles.

What is the situation for authors whose papers will be published early in 1978, yet who have not signed a statement of transfer? During this transition period, AIP intends to publish without the transfer of copyright if need be; however, these authors will be asked to complete the form so that journals and other publications of AIP will eventually obtain copyright for all the articles for the first calendar year, 1978, under the new law.

—BCC

Frosch of NASA

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House commitment to space exploration and NASA in general, "as to whether we really need the Shuttle, whether it's really worth it." Those who regard the future as assured for Federal projects on which much time and money have already been spent might do well to recall the fate of the Clinch River Breeder Reactor. However, the new Administrator also said that the President and his staff do have considerable interest in space applications—such as the Landsat and Seasat programs, communications technology and aeronautics progress. Frosch told us, "I'm pushing a shift in the nature of NASA in the direction of useful applications and good science" as the basis for the agency's continued funding; "this has already begun to happen," he added.

With such a scaling down of objectives, we asked, is it really necessary that NASA continue as an independent agency, or could it function as a departmental appendage, like NOAA? (The National Oceanic and Atmospheric Administration operates within the Department of Commerce.) According to Frosch, NASA must remain independent if it is to do its job well. "The applications business alone drives NASA into working with a number of Governmental departments," he told us, naming NOAA (and other parts of Commerce), Interior, Agriculture, Transportation, Defense and the Coast Guard as examples. "Traditionally, it has been difficult for an agency within one department to work effectively across departmental boundaries."

"I've been saying NASA has four functions," says Frosch. He lists them as aeronautics and aviation ("... which I've taken to saying first because people have taken to leaving it out"); useful applications, such as surveying and weather monitoring; science, including not only the traditional planetary, solar and interstellar research efforts but also the "downward-looking" sciences (for example, geology and atmospheric science), and the production of the technology needed to do the first three better. The technological component may also include, he said, NASA's development of techniques valuable in themselves; technology discovered in space applicable to industrial activity is one example.

Continued vacancies at L5. We asked why Frosch failed to name sending humans into space as a function of the space agency, to which he replied, "My view is that you do manned activities because you need people on hand to do something; if you're very specific about what it is you want to do, very precise about what data you're looking for, then you can probably send a machine." Human brains and hands need be present only when the work—general exploration, for instance—involves a large measure of the unanticipated. A manned mission to Mars, he said, "probably could" have settled on the spot the question of Martian life, but at much greater expense than the ambiguous Viking experiments. Frosch described the Viking effort as a constrained, primitive version of a new category of mission instruments he calls "extensors"—remote-operation, remote-viewing devices that permit a type of delayed-response exploratory activity midway between the manned and unmanned mission options. As Frosch puts it, "The man is *here*, but his hands and senses are, to some degree, *there*." He believes the extensor option will receive increased attention in the future.

Washington Bulletins

★ Funding for Isabelle, Brookhaven National Laboratory's proposed colliding-beam proton accelerator, moved a step closer to reality when the House and Senate passed a public-works appropriation containing $5 million for detailed design and some procurements for the project. The question of authorization, deferred over the Congress's August recess, should be coming up soon. The House's FY 1978 authorization bill for ERDA includes $10.5 million for Isabelle's construction; the project has enjoyed strong and consistent support from Congressmen Jerome A. Ambro (D–3rd CD, N.Y.), Otis G. Pike (D–1st CD, N.Y.), Thomas J. Downey (D–2nd CD, N.Y.) and John W. Wydler (R–5th CD, N.Y.).

★ **Two out of three for NRC.** The Senate Committee on Environment and Public Works has voted in favor of the nominations of Joseph M. Hendrie and Peter A. Bradford to membership on the Nuclear Regulatory Commission; Kent F. Hansen, a third nominee and a supporter of the Clinch River Breeder Reactor project, failed to win committee approval. Since 1975 Hendrie, a nuclear physicist, has headed Brookhaven's applied-science department.

★ **An appropriation of $861.3 million for the NSF** in FY 1978 is the outcome of a House-Senate conference—$85.4 million more than was approved for FY 1977 but still $23.7 million less than the Administration had requested. A total of $783.2 million is allocated for research and related activities, including $63 million for the Research Applied to National Needs program, and science education receives a 24% increase—to $73.2 million—in the new bill.

What about permanent human colonies in space? "I haven't gotten it clear yet what are the key things that would require continuous occupancy," Frosch said, referring to the idea of manned space stations. He believes that as experience is gained with the Space Shuttle, some experiments and possibilities for applications will be found that will drive NASA in the direction of ever longer missions. In his opinion, therefore, the colonization of space will take place "as a more or less evolutionary process, rather than a sudden jump where we put, say, 50 people at L5 or whatever." Frosch dismisses for the present the suggestion of Gerard K. O'Neill (see PHYSICS TODAY, September 1974, page 32) and others that giant human colonies be placed in orbit at the Earth–Moon Lagrangian-point neighborhoods (such as L5). "We'll probably go on thinking about it," he told us, "but I'm inclined to put that aside until there's a driving reason for doing it."

Benefits from space activities. Those who question the overall usefulness of NASA's efforts, though, have "short memories," according to Frosch. He listed satellite communications, improved meteorological predictions and Earth-resource sensing as but a few of the developments that prove NASA is something more than "a kind of public-works program for scientists." Another, often overlooked spin-off from the space program, he said, is the capability to manage very large, complicated technical systems. "Whether that means that the people who manage operations like the Viking mission could or should manage things like BART [San Francisco's Bay Area Rapid Transit system] or the Washington Metro," Frosch told us, "I don't know. Some of the skills would be applicable, but if you do that with a group of people then you're not really maintaining their expertise—you're employing them to become something else altogether." He noted that if the Jupiter Orbiter–Probe had not been voted start-up money for 1978, the scientists and engineers on NASA's planetary-exploration teams—especially at the Jet Propulsion Laboratory—would have been left with no means to stay usefully occupied. "I've asked people to look further at what's needed to maintain that capability through such a period, what rate of activity is necessary to keep such a team alive," Frosch said. He sees such maintenance as the preservation of a national capability. —FCB

in brief

Nominations are now open for the fourth Marconi International Fellowship, which is a $25 000 grant for "creative work in science, technology and humanism." Information regarding the Fellowship may be obtained from the Aspen Institute for Humanistic Studies, 1919 14th Street, Boulder, Colo. 80302, and nominations are due no later than 15 October.

Solid-State Physics in the People's Republic of China, a trip report of the American Solid-State Physics Delegation, is available from the Printing and Publishing Office of the National Academy of Sciences, 2101 Constitution Avenue NW, Washington, D.C. 20418 at a cost of $10.25 per copy.

the physics community

AAPM elects Bjarngard, acts to change bylaws

The American Association of Physicists in Medicine has chosen Bengt E. Bjarngard as its president-elect for 1978. Bjarngard is an associate professor in the Harvard Medical School department of radiation therapy.

The AAPM is in the process of changing its bylaws and rules to allow its officers to serve terms that coincide with the calendar year; therefore, this year's president, William R. Hendee (University of Colorado) will be serving an extra half-year in office. In January 1978, Peter Wootton (University of Washington) will succeed to the office of president and Bjarngard will assume his post as president-elect.

BJARNGARD

Bjarngard was educated in his native Sweden where he received his PhD in radiation physics in 1962 from the University of Lund. He then worked for four years as a research physicist at the Atomic Energy Co before moving to the US to become director of radiation physics at Controls for Radiation Inc. He joined the faculty of Harvard Medical School in 1968 and was named to his current position in 1974. Bjarngard's research interests include dosimetry and medical radiological physics.

Leshowitz is first ASA Congressional Fellow

Barry H. Leshowitz, associate professor of psychology at Arizona State University, has been named the first Acoustical Society of America Congressional Science and Engineering Fellow. The fellowship, which is co-sponsored by the American Association for the Advancement of Science, will be given to Leshowitz for the academic year 1977–78.

Leshowitz studied as an undergraduate at Brooklyn College and earned his PhD from the City University of New York in 1968. From 1968 to 1970 he was a National Institutes of Health postdoctoral fellow at the University of California, San Diego, and then he joined the faculty of the Arizona State University. Leshowitz spent one year, 1976–77, as a research fellow at the Institute for Perception Research, Eindhoven, The Netherlands.

LESHOWITZ