NASA's outgoing director calls for expanded space effort

by Robert Zubrin

On Jan. 15, 1981, outgoing National Aeronautics and Space Administration (NASA) director Dr. Robert A. Frosch presented NASA's proposed budget for fiscal year 1982. The new budget of $6.7 billion represents an overall increase of 21 percent in nominal dollars, or a real growth of about 9 percent over fiscal 1981 after inflation has been discounted. If approved, this budget would be the first significant expansion of NASA after over a decade of cuts. In 1964, NASA received almost triple this amount, measured in constant dollars.

The budget places the completion of the development of an operational space shuttle capability as a top priority "on which," as Dr. Frosch emphasized in the accompanying statement, "our future in space depends." The budget also allocates money for the development of a new type of deep-space rocket engine, the Solar Electric Propulsion System, or ion drive, which, with its extremely high exhaust velocities, promises to be over ten times as efficient as conventional chemical rockets in propelling interplanetary exploration missions.

In addition, the budget calls for the development of Venus Orbiting Imaging Radar (VOIR) spacecraft, to be launched from the space shuttle in 1986 to probe Venus's dense cloud cover by radar and to map the planet from orbit. Work will also be continued on the Galileo probe to Jupiter, on the International Solar-Polar Mission, on the Space Telescope, and on the Gamma-Ray Observatory, all of which will vastly expand our knowledge of high-energy and plasma physics (vital to the development of controlled nuclear fusion as a new, infinite source of energy).

Finally, the budget includes a host of satellite missions with vast immediate applications including Landsat-D, which will expand earth-resource observations from space with the emphasis on agricultural applications; the Geological Applications Program (GAP), which will study the earth's geological resources on a continental scale, and which could ultimately lead to large-scale discoveries of resources such as minerals, oil, and gas; and improvement of the National Oceanic Satellite System (NOSS), which, within the decade is expected to be able to help plot optimum maritime routes, to forecast regional fish catches, to help avert coastal disasters, and provide useful information concerning the oceans, the weather, and the atmosphere. Other NASA projects can result in significant improvements in computer technology and aircraft design.

Frosch's proposed budget is simultaneous with several congressional initiatives designed to help revive NASA as the cutting edge of the nation's scientific and technological base. Such initiatives include Sen. Harrison Schmitt's (R-N.M.) proposed National Space and Aeronautics Policy Act that would set a general calendar and spending parameters for a 30-year space effort, as well as Rep. Don Fuqua's (D-Fla.) proposed Space Industrialization Act, which would set up a fund to encourage private sector innovation in space.

Schmitt, who is chairman of the Senate Science and Technology Committee, has also authored a recent memorandum to OMB Director David Stockman, which pointed out the administration's important role in fostering U.S. industrial recovery, and forbade any attempt to cut the budget either for NASA or for the Department of Energy's nuclear research.

Commenting on the budget, Frosch said, "This budget . . . was produced in a highly constrained fiscal environment. It is good, but not as good as it should be if we are to revitalize NASA as the cutting edge of our scientific and technological progress.

"We need a long-term investment philosophy for NASA, which recognizes that the payoffs will include not only improved knowledge of the Earth and the universe, but improved economic performance and more jobs here at home."

The following is an exclusive interview Dr. Frosch granted to *EIR*.

EIR: As the outgoing director of NASA, what kind of space program do you think this country should have?
Dr. Frosch: Rather like it has, but somewhat larger, and we need to do some more science and technology development around the shuttle, and work into more ability to do construction and assembly in space.

EIR: Which missions do you see as crucial?
Dr. Frosch: It's not so much a case of crucial missions

but crucial technology areas, robotics, for example—the ability to do construction in space, the ability to use more solar energy in space.

EIR: What kind of budget do you think is necessary?
Dr. Frosch: Large, but not too large; that is, it would be a large amount of money but not a large percentage increase. I think NASA could do very great things with about a 20 to 25 percent increase.

EIR: Do you think NASA is likely to get it?
Dr. Frosch: No, that is unlikely, but it would be sensible. The economic payoff from this type of expenditure would be large. The applications part of the NASA program has translated into direct economics. It is old history now that it has revolutionized communications globally, and right now we are in the process of revolutionizing it all over again. . . . There is a big revolution coming in our ability to manage the environment, agriculture, and so on. There is a lot of technology developed in the space program that turns out to have a whole string of other industrial uses. In the biomedical area, for example, the pacemaker, which comes directly out of space technology. A lot of the basis of the new solar cell technology came out of satellite design. . . .

In fact, it turns out that research on space science and technology is a driver of productivity. Robotics, which was developed partly by NASA and partly by other sources, is going to have an increasing role in making sure that the U.S. is able to put out an automobile, and compete with the highly mechanized Japanese.

EIR: What do you think of the new space program bill Senator Schmitt is going to introduce?
Dr. Frosch: He has introduced several bills. . . . I think that the major point with all his bills is pushing the space program as a way of driving high technology and raising productivity. That makes sense. If it's a very general goals bill over a twenty-, thirty-year situation, I'm not sure it will help the situation very much, however. To the extent that it would produce a better climate for appropriations for the space program, that would be a good thing, but I'm a little skeptical.

EIR: Why?
Dr. Frosch: Because it's not a money bill, and it's not even a direct authorization bill, and I'm not sure that a general bill without authorization will have much effect. What we need is a bill concerned more with authorizations and appropriations, rather than just a group of long-term goals.

EIR: Apart from that aspect, what do you think of the bill's schedule of goals? He poses the 1980s as the decade for perfecting satellite and communications technology, the 1990s as a decade of developing orbiting manned capabilities, and the first decade of the 21st century as a decade of interplanetary exploration.
Dr. Frosch: I'm not sure dividing it up that way makes all that much sense. I think that the real progress takes place in a much more disorderly way. You have to do some of all those things all the time.

EIR: What about the recent proposal to use space-based laser systems as a means to destroy ICBMs as they emerge from the atmosphere?
Dr. Frosch: Well, I haven't studied the issue long enough to have a definite opinion. I think it's possible, but the energy requirements for the laser would be very large, and it is not all that clear that there aren't equally or more effective ways of doing the same job, such as shooting metal at the missile instead of using a laser.

EIR: Would development of such a system have a significant positive effect on the space effort?
Dr. Frosch: Well, being military, it would not be a NASA program, of course. But the technology of NASA and such a program might tend to support each other. There is a NASA interest in high-power lasers for a different purpose entirely, and that is as a means of transmitting energy from a central power station to an outlying system along a laser. . . .

EIR: What is going on with the development of deep space rocket systems using nuclear power or fusion?
Dr. Frosch: Not much right now; there used to be a program on that 10 or 12 years ago, but it didn't get very far. There is a program for developing nuclear power to provide electricity for spacecraft, and there is some discussion of a nuclear-powered electric propulsion system, to propel the ions, though it's mostly talk. We are doing a lot of work on solar-powered electric systems . . . for the exploration of the outer solar system.

EIR: Do you think NASA's priorities in these areas should be increased?
Dr. Frosch: No, I would keep it as a relatively low priority. NASA should apply them to space after they have been developed on earth for their energy applications in their own right.

EIR: What about manned interplanetary exploration?
Dr. Frosch: I think it will happen, but not before the 1990s. We have to build up a lot of technological capabilities. A Mars mission would be at a minimum a three-year mission, and that would take a lot of support, a very large spacecraft, and a lot of biomedical experimentation before we are ready to do it. I think there is at least a decade's work before we are ready; it might be accelerated, but not much.

EIR: What do you think of the proposal for sending an unmanned probe to Mars to retrieve soil samples, which would enable us to determine if there is life there?
Dr. Frosch: That is the most probable next large step on the agenda for Mars, although there is a school of thought that would rather put a roving laboratory on the surface. I think myself, though, that the consensus in the scientific community is that the Mars soil retrieval is the right thing to do. That might be about 1986, 1987.

EIR: You think it could be done that soon!
Dr. Frosch: I think it could be done in the next few years. But in the line of priorities, unless there was a great expansion of the program, I don't think it would be started until the mid-eighties.

EIR: What would be the major technological barriers?
Dr. Frosch: I think we have the technology now. There are two problems, both of which are probably solvable. One is that you have to land enough mass on the planet so that you can scoop up the soil and get it back to rendezvous orbit, and then you have to make a real robot rendezvous.

EIR: And the problem of constructing a spacecraft that can blast off again to escape from Mars' gravity is not a major hitch?
Dr. Frosch: Right; in fact, one interesting idea for conserving mass is just to send the fuel down with the craft and collect the oxygen on Mars. That is, not send liquid oxygen down with the probe, but manufacture it on Mars using oxygen released from the Martian soil. That would save the weight of carrying the liquid oxygen.

EIR: What do you see in the way of future probes to Venus?
Dr. Frosch: Well, in the budget there is the beginnings of an orbiter to look at the surface of Venus with radar. We already had a crude one, but this would be high-quality radar. We know that there is a mountain range the size of the Himalayas, but we don't know anything about its structure. This would give us enough information to tell us a lot about its structure and geology.

EIR: And the outer planets?
Dr. Frosch: There is the Galileo program to put an orbiter around Jupiter for a while and send a probe into it, and take a good look at some of its satellites. And there is a plan, though not for startup until 1986 or 1987, for the Saturn orbiter probe, which would be an orbiter of Saturn, a chemical probe into Saturn, and a chemical probe into Titan.

Heritage Foundation: scuttle the shuttle

Below are excerpts from the Heritage Foundation report, "Agenda for Progress," recently submitted to the Reagan administration. The foundation promotes "free market" economics.

An excellent illustration of the pitfalls of federal intervention at too low level is the space shuttle. . . .

Federal officials talk in terms of a commitment to finish the shuttle development and procurement, but the wisdom of this commitment is not clear. An early item of business for the federal government should be a reexamination of the economics and institutional arrangements for space transportation. In spite of the perceived wisdom that there is no turning back on the shuttle commitment, the alternatives should be reviewed thoroughly and soon. Alternatives to be examined include the discontinuation of the shuttle program. . . .

Since matter is everywhere, it might seem that high-energy physics would have wide practical applications. On the contrary, except for some possible applications of accelerator technology, the processes studied involve conditions so extreme that they seem applicable only to phenomena occurring in the smallest subatomic distances or under the most remote astronomical circumstances. As far as we can foresee, the $359 million high-energy physics program is, like astronomy and space exploration, the accumulation of knowledge for its own sake—with no immediate practical benefits in sight. . . .

A characteristic of research with no foreseeable objective is that it can be slowed down at no known economic penalty (except for increased costs for changing one's mind and accelerating the research soon thereafter). *The stretchout of expensive undertakings, such as new accelerator projects or spacecraft development, can save hundreds of millions of dollars in early years while the U.S. seeks to negotiate international cost sharing* [Italics in original]. Closing one of the three high-energy physics complexes could save on the order of $100 million per year.