A U.S. space station: Plus or minus for planetary exploration?

For years, the National Aeronautics and Space Administration (NASA) has hoped that the United States would undertake to develop a permanent, manned station in space. Since May 20 of last year, a formal "space station task force" has been at work looking at mission possibilities, candidate designs, roles for international cooperation and other aspects of the huge endeavor. And last month, NASA administrator James M. Beggs told participants at a large, international meeting of his expectation that the White House will approve the initiation of a U.S. space station program within the next 6 to 12 months.

NASA, he said, would be seeking $200 million in first-year funding for the effort in the administration's fiscal 1985 budget plan, with as much as $600 million for FY 1986 and a billion dollars the year after that. Envisioned as being in orbit by 1991, the four-to-six-person station would cost an estimated $6 billion to $8 billion.

Also seeking to get going in FY 1985, however, is a plan to restore the long-dwindling U.S. role in unmanned exploration of the planets. Developed by the NASA-chartered Solar System Exploration Committee (SSEC), the plan calls for development of two series of low-cost spacecraft that would be sent on diverse missions to other worlds (SN: 4/16/83, p. 250). And sought in the same budget proposal that includes $200 million to begin the space station is another item — of a relatively mere $20 million — to initiate the first of the new probes, called "Planetary Observers," and to get started on the first of their missions, a geochemistry/climatology orbiter of Mars.

Is there room for both? Many space scientists have complained that the high development costs of the space shuttle cut deeply into the amount of money left over for science, particularly planetary exploration. Combined with the effects of inflation and growing military expenditures, it was feared as recently as two years ago or less that the U.S. planetary program was on the verge of coming to an end. Some of that fear has lessened, due in part to the activities of the SSEC, but some of those same worried researchers are now waiting to see whether the massive effort of a space station will pose a similar threat.

"I don't feel threatened by the space station," says Geoffrey Briggs, director of NASA's solar system exploration division and executive secretary of the SSEC. "It's my belief that the agency is going forward with a renewed commitment to planetary exploration, and with a very strong goal to get the space station going. I think they're going to be pushing them each in a different way, but with equal enthusiasm."

On the other hand, the agency has been soliciting comment from space scientists about the research potential of the station itself, and although there has been some response, Briggs acknowledges that it has been less than enthusiastic. "I think that the instinctive reaction of the science community has been — and to a certain extent still is — to oppose the space station," he told SCIENCE NEWS. "Not because they're so unimaginative they can't think of things it might do, but because they've been bitten once. They don't want to get bitten again."

Planetary researchers have been concerned not only about the shortage of new spacecraft missions but about funds to continue analyzing existing data. A suggestion in 1981 by NASA deputy administrator Hans Mark that a new generation of planetary probes might be launched from a space station, in fact, was taken by some scientists to represent the ominous possibility that any future missions might have to wait until the station was a reality. Says Briggs, "I think, rather clearly, that it wouldn't be possible for the agency to take that point of view and be successful. The community has been very specific in its recommendations. The agency just could not make a tenable argument that says 'wait until later' to use a space station. ...If we were trying to get started with a Mars sample-return mission [a major undertaking] in 1985, I think I would be concerned. But I don't see the kind of restrained program that the SSEC is recommending being at all incompatible with the agency developing a new thrust in the space station."

Even the SSEC is considering some major mission possibilities, however. This week, in fact, the SSEC is meeting at Snowmass, Colo. to discuss a Mars sample return and other candidates that might be best done with a space station's help. Will NASA's space-station push help or hinder planetary research? "It's too early to tell," says Clark Chapman, chairman of the American Astronomical Society's Division for Planetary Sciences and a researcher at the Planetary Science Institute in Arizona, "but there's a lot of latent worry." —*J. Eberhart*

Satellite hit by its own rocket

Payloads being launched into space are sometimes subjected to extremes of acceleration, vibration, temperature and other conditions. Few, however, have had to endure the mishap that befell the OSCAR 10 "ham" radio satellite after it was already presumably safe in orbit—when it was struck from behind by the rocket that had put it there.

OSCAR 10 (short for Orbiting Satellite Carrying Amateur Radio, latest in a series that began in 1961, only four years after the first Sputnik) was launched together with another satellite on June 16 by the sixth of the European Space Agency's (ESA) Ariane rockets. Last September, a malfunction on Ariane 5 had left its two satellites on the bottom of the Atlantic (SN: 9/18/82, p. 180), threatening Ariane's role in the commercial launch business, so officials had a double reason for concern about the next flight's success. Ariane 6 performed right on the numbers, first deploying the ECS-1 European Communications Satellite and about two minutes later releasing OSCAR 10. Both would then fire their own built-in "kick motors" to carry them up to their destined orbital positions.

ECS-1 behaved as planned. Just 55 seconds after OSCAR 10's deployment, however, telemetry from the rocket indicated an abrupt jolt, followed two seconds later by another. Subsequent signals showed the satellite to be incorrectly oriented in space, with its solar panels angled about 70° away from the sun, and instead of spinning at about 10 revolutions per minute (rpm) in one direction, it was turning at about 2.5 rpm the other way.

Analysis suggested that OSCAR 10 had been hit by the Ariane rocket's third stage, from which it had just been separated and which was apparently driven forward by the expulsion of left-over liquid oxygen (LOX) being vented from the booster's tanks. Such residual LOX is deliberately let out of the stage after use to prevent an explosion caused by expansion due to the sun's heat, which could create a clutter of potentially damaging debris in orbit. In this case, ESA reports, the venting produced a "higher than expected residual thrust," and planners of future flights are expected either to delay the venting procedure or to redirect the spent stage beforehand.

Fortunately, natural forces such as atmospheric drag combined to correct the satellite's misalignment, merely requiring a three-week delay before the first of two planned firings of the kick motor. Apparently, however, says an official of AMSAT, OSCAR 10's builder, the impacts did more damage than originally believed, because the helium pressurizing the motor's propellants drained away before the second firing could take place. The inference? "A crack in the plumbing."

The result is that OSCAR 10's orbit is tilted 26° to the equator instead of a planned 57°, so that the orbit's low point will shift more rapidly than planned into the Southern Hemisphere, away from where most of the world's radio "hams" are concentrated.

But at least the satellite is working. Its predecessor, which *would* have been OSCAR 10, never made it past the 1980 launch malfunction of Ariane 2. —*J. Eberhart*