The Space Shack

The Administration, pushed by Congress, backs an automated, private space lab, overriding NASA's fear that the project will undercut the manned space station

WHEN Joseph Allen and James Calaway talk about a metal tube (14.5 feet across by 35 feet long) they hope to send into space by 1992, they refer to it as a "quonset hut," a "shack on the frontier," or a "tool shed." This is a very modest way to describe the Industrial Space Facility (ISF), a tightly engineered, intricately financed, $1-billion private project that is more ambitious than any to have flown on the shuttle thus far.

If these terms for the ISF seem humble, there is a reason. The investors hoped to slip unobtrusively into town and win financing without drawing fire from the bureaucracy. But things did not work out that way.

Congress liked the idea of signing up in a joint venture with Space Industries, Inc., creator of the ISF, and sent the project with a blessing to the White House last December. But adversaries, including top officials of the National Aeronautics and Space Administration (NASA), stepped in and held the ISF hostage for more than a month in the White House—until President Reagan finally endorsed the concept in a space policy statement on 11 February (see box). In forcing the project on NASA, Congress has shown that it has the power to step in and rearrange the agency's priorities when it chooses.

The amount of federal support for the ISF has not been fixed, but could run as high as $700 million. Likewise, the physical cargo remains vague. Speaking as a good service industry executive, Allen says the package will include "Whatever your heart desires," if you are paying the rent. Space Industries promises 10.8 kilowatts of continuous power (or up to 50 kilowatts in bursts) and 2500 cubic feet of work area. The canister will not support life except when attached to the shuttle. If modified, the orbiter might remain connected for 35 to 45 days a year, but most work would be carried on by robots. The orbiter could revisit the lab every 4 to 6 months.

Allen, a former astronaut, and Calaway, a Texas political scientist with an Oxford degree, went to Congress last year to promote the ISF as a joint venture between the government and their employer, Space Industries, Inc., of Houston. The company was founded in 1982 by Maxime Faget, the chief executive officer, formerly a top spacecraft designer at NASA from 1962 to 1981.

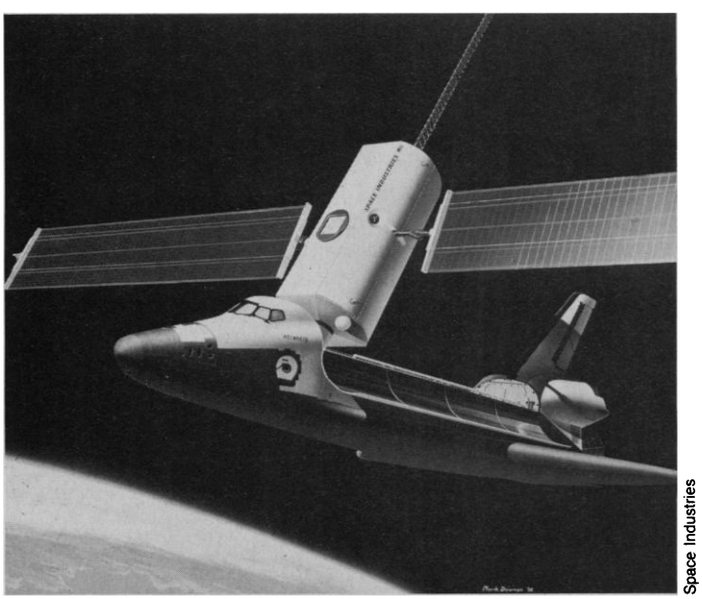
The lobbying paid off in December. Congress pledged $25 million to ISF in the 1988 finance bill (P.L. 100–202), inserting a clause that directs NASA to "conclude a satisfactory funding arrangement that will lead to a workable leased ISF vehicle in the 1991–1992 time frame." The words were added at the request of Senator William Proxmire (D–WI), Representative Edward Boland (D–MA), and Representative Bill Green (R–NY), three of the four ranking members of space appropriations subcommittees.

The most authoritative critic is James Fletcher, NASA's chief, who told Congress in a letter last month that he has no use for the ISF. There are not enough payloads to go aboard it in the next 7 years, he wrote, and even if there were, NASA does not want to bankroll this company without exposing its idea to open competition. Transportation Secretary James Burnley IV backed Fletcher on the procurement point. This delayed action for a time.

The procurement problem was dealt with in the new space policy statement by permitting other companies to put in proposals for an industrial space facility. But this may not mean much. Space Industries is expected to be the only bidder.

There is a long-standing and often ignored rule in this Administration against subsidizing industry. It was not invoked in this case. Everyone recognizes that there will be no "commercial" activity in space without government support. The most vocal advocate of helping space industries to go their own way is the Commerce Department's office of commercial space programs, headed by Greg Fawkes. He and his staff have quoted NASA-funded reports to show that the time to begin giving help is now, and that the ISF is a good candidate to begin with.

For example, they cite a review of microgravity science released last June by astronaut Bonnie Dunbar. It recommends that the ISF be used as a lab in which to conduct advanced research requiring ultrafine gravity control, better than can be had on any manned vehicle. This report, it should be noted, backs just about every good idea for microgravity research, including a doubling of the NASA microgravity science budget by 1990. Doing this, the report says, will "preclude what may become an embarrassment" in 1990 and 1991 when several well-planned European and Japanese research projects are launched, including a lab very



Space Industries

Joint venture.

Only $700 million in federal leases will buy a place for this Industrial Space Facility (ISF) in the national agenda for 1991–1992. Designed originally as an automated materials processing center, the ISF is now being sold to the government as a space-based research lab and test bed for equipment to be used on the manned space station. But astronauts would be able to use the lab only while the shuttle is attached, perhaps 35 to 45 days a year.

A New Space Policy

After 5 months of analysis and many last-minute delays, the Administration launched its new "Space Policy and Commercial Space Initiative" on 11 February with a press conference at the White House.

The main thrust of the policy—whose broad terms were endorsed by the President on 5 January—is to assure U.S. companies that they will get more federal help in exploiting space and that "the government will get out of the way," as one speaker said.

To drive home the point, the secretaries of Transportation and Commerce, James Burnley IV and William Verity, Jr., stood side by side on the podium with James Fletcher, the administrator of the National Aeronautics and Space Administration (NASA). Verity said the new policy "shifts the emphasis from the public to the private sector" and asks NASA to focus on what it does best: research and development. Asked if the policy was the cause of warfare among the agencies, Burnley said there were "vigorous but friendly discussions along the way."

The material given out by the White House cites goals, initiatives, and directives, but few tangible programs. Perhaps the most striking addition to the list of objectives is one that commits the government to expanding "human presence and activity beyond earth orbit into the solar system." It is not clear yet which steps will be the first along this very ambitious path. But the Administration promises to spend about $100 million at NASA in 1989 to develop "Pathfinder" technologies, creating "know-how in critical areas, such as humans in the space environment, closed loop life support, aero braking, orbital transfer and maneuvering, cryogenic storage and handling, and large-scale space operations."

The statement listed many other points, including:

- The President will ask Congress to spend $1 billion on the manned space station in the next budget and a total of $6.1 billion over the next 3 years.
- NASA agrees that it will help finance a private, for-profit research lab to be launched aboard the shuttle by 1993 (see accompanying story). Space Industries Inc., has already put in a proposal, but Fletcher said other bids will be invited and a winner will be named within 150 days. NASA will work out an arrangement for leasing space in the lab, paying $140 million a year over the next 5 years. Fletcher said the project would be an "add-on" to NASA's budget.
- NASA also promises to launch in the early 1990s a "commercially developed, owned, and managed shuttle mid-deck module" called "spacehab." Former NASA chief James Beggs has just become the president of a company that intends to create spacehab. The module increases the usable work space on the shuttle by about 400%, and will be used for low-gravity experiments.
- By executive order, the President will create a National Microgravity Research Board to encourage science in this area and set priorities. NASA will head the board, and it will include officials from the National Institutes of Health, the National Science Foundation, and the departments of Commerce, Transportation, Energy, and Defense.
- Anyone who wants them will be invited to take possession of the external tanks of the space shuttle, once they have been expended and are in orbit, for "research, storage, or manufacturing in space." NASA will provide technical assistance for the users on a direct cost basis.
- All federal agencies, including NASA, are instructed to use private launching companies to the greatest extent feasible.
- The government will explore the idea of giving vouchers to researchers so that they may make their own arrangements for getting payloads sent into orbit. Those who have already been listed on the shuttle may be given a voucher to purchase a ride from a private launcher.
- To encourage the growth of private launch firms, the Administration will back legislation setting a cap of $200,000 on noneconomic damage awards to third parties claiming injury in commercial launch accidents. In addition the government will set a limit on the reimbursement it would seek in an accident.
- The national security rule that limits public satellites to broadcasting images with 10-meter resolution or more will be lifted. A new standard is being developed to encourage more U.S. companies to get into the satellite image business. ■ **E.M.**

like the ISF called Eureka.

Senator Proxmire, who has backed the ISF for some time, likes it because it is not expensive when compared with NASA's proposed $14.6-billion space station. Proxmire claims the ISF will help, not hurt, the space station because it can be used to pretest equipment. But, as an aide says, if it turns out that investing in the ISF demonstrates that it is unnecessary to build the big station, so much the better. Proxmire, who likes to award a "golden fleece" to projects he considers wasteful, in other circumstances might have singled out the ISF for a prize. But instead he has embraced it, perhaps in a strategy of fighting fleece with fleece.

NASA balked at first. But on 21 January the congressional trio wrote a sharp letter to Fletcher, serving notice that $90 million in space station funds would be withheld "until these issues are settled." On this basis, the ISF may get into the next budget.

Executives at Space Industries did not mean to become so entangled in politics when they set out several years ago. The original plan was to find money in the private market, mainly from companies interested in doing research or materials processing in space, and to ask NASA for help in getting capsules launched. That scheme was born in 1982 when commercial hopes were high.

In 1985, James Beggs, then chief of NASA, gave the company a place on the shuttle's cargo manifest, promising to put the first ISF module into orbit by 1989. The launch fees would be deferred until later, when the investors could collect rent. Beggs invoked some lofty rhetoric from a 1984 White House policy statement, predicting that space-related businesses "could well mean tens of thousands of jobs, billions of dollars in new foreign trade, and tens of billions of dollars added to the gross national product." Soon, Beggs said, the ISF would be part of "an industrial park in space."

Five months later, the shuttle Challenger crashed, darkening many of these dreams. "It became clear to us shortly after we lost the Challenger," says Allen, "that because of the major slowdown in everything, we would either have to shelve the project or we could set out to interest the federal government in becoming the anchor tenant." They decided to court the government.

One Senate aide says that the amount of federal help requested by Space Industries has been "fluid" and that, early on, it was 30% to 40% of the total capital needed. Now it stands at 60% to 70%.

The current plan, Allen says, is to secure an "anchor lease" from the government hav-

ing a value of $650 to $700 million. (The charge for the first shuttle ride will be deferred until the project is making money.) About 30% of the space will be available for other users. The investors will put equity of $200 million to $250 million into the project, paying interest on a debt of around $400 million. Allen concedes that this is "a little different from how the federal government would normally procure things." But it is the way big real estate deals work.

Although it is not advertised as such, the project is novel in another way: it directly challenges NASA's authority to design and build space vehicles and to set the agenda for space research. In a sense, Faget is saying that his idea for building infrastructure is better than NASA's, and he is going to Congress and the White House—over NASA's head—to carry out the plan. The money will come directly from NASA's budget, meaning the agency will be forced to pay for a project it disapproves of, even if this means delaying NASA's own plans.

The risk, of course, is that Congress will favor this tool shed over the $14.6-billion U.S. space station. With the budget for discretionary projects in dire trouble, it will be tempting to back a project taking 3 years rather than 10 years to launch and requiring one shuttle flight rather than 19. There is silent support for the ISF among the "worker bees" in space science, according to a Senate aide, despite the opposition of top NASA managers. Because of its short lead time, the ISF could rescue some of them from a long wait for access to space. "Do you really think people want to invest 5 years of a career in one data point?" asks a scientist at AT&T's Bell Laboratories.

With the ISF, it might be possible to reduce the backlog of experiments waiting for a ride on the shuttle, including some academic projects, although using the ISF for this purpose would require some new flight hardware. Charles Lundquist of the University of Alabama at Huntsville recently ran a survey for NASA on potential users of the ISF. He found that there are enough in line already to fill at least one capsule. However, because the ISF lacks strong external attachment points, it would not be useful for astronomical or earth observing systems.

Even if Congress sets out to make the ISF and the space station complement one another, the two are likely to compete for funds, and this could delay the larger manned base. One sign that this may be happening already was the announcement on 8 February that NASA's associate administrator for the space station, Andrew Stofan, age 53, is retiring after 2 years at the helm. A spokesman in his office says that there is no connection between Stofan's departure and Congress's manhandling of his program.

Publicly, many space agency officials say they adore commercial ventures, even the ISF. Privately, a high level NASA aide grumbles that the ISF is a "moving target . . . an idea that exists only on paper." Congress, he says, has ordered NASA to create a "warm and fuzzy environment for this thing." The big problem is not making use of ISF, because "we can go create users." Rather, it is that the ISF is a "displacement activity," shifting resources from goals chosen by NASA officials to those chosen by Congress and some Texas executives.

Faget recently found himself so "distressed" by reports that the ISF was seen as a substitute for the space station that he wrote a letter declaring that "nothing could be further from the truth." He pointed out that astronauts cannot live in the ISF unless it is attached to the shuttle, and that unlike the station, the ISF does not use "cutting edge" technology. It "complements" the station, he insisted. But attempts to wish the competition away have not changed the reality.

One critic, John Pike, a policy analyst at the Federation of American Scientists in Washington, D.C., attacks the ISF from another direction. "There is a mania for anything with the label 'commercial' pasted on it," he says. He sees the ISF as a diversion from the main task of creating a workable transportation system. Attempts to win a subsidy for ISF represent "a raid on the public treasury." In Pike's view, the ISF is a glorified version of the "extended duration orbiter," an orbiter modified to stay in space for weeks. The advantages of the ISF are that it provides more power, more shelf space, a quieter environment, and a longer time in orbit for automated projects, particularly valuable for industrial processes or long-running materials experiments. But Pike argues that it is premature to invest in this capability. "This is a very weird way of doing space policy," he concludes.

These comments and some skeptical remarks made by congressional aides about the ISF's financing suggest that the debate is not over. It is clear however, that NASA's freedom to set its own agenda has been eroded by the scrap over ISF and the agency must now pay attention not just to its own parochial constituency but also to the Commerce and Transportation departments. And NASA will have to balance interests that often compete, it seems, without much guidance from the President. The prolonged administrative hassle over the ISF and the space station suggest that only sluggish direction is coming from the President. ■

ELIOT MARSHALL

Briefing:

Congress's Handiwork on the R&D Budget

An analysis of the budget that Congress finally passed in the waning days of 1987 indicates that overall federal support for research and development will rise by just $2 billion in fiscal year 1988, which began on 1 October. That is almost 8.9% less than the Administration had requested.

Defense spending is estimated to account for 67.3% of total federal R&D expenditures. The $61.1-billion defense R&D budget is up by 0.9%, but falls $6 billion short of the President's request. In contrast, the budget for nondefense R&D will climb by about $1.6 billion (9%) to $19.9 billion.

Funding for basic research rose to $9.8 billion, a 6% increase above last year's level. After inflation, however, real growth is expected to be about 3%. Most of the increases in basic research are occurring at the National Institutes of Health and the Department of Energy.

The details of the 1988 budget are contained in *Congressional Action on Research and Development in the FY 1988 Budget.* Copies are available from the AAAS Office of Public Sector Programs. ■ **M.C.**

Press Asks Reprieve for Condemned Somalis

National Academy of Sciences (NAS) president Frank Press has sent a telegram to Somali president Mohammed Siad Barre urging pardons for eight political prisoners who were convicted of treason and sentenced to death early this month.

Two of the condemned, mathematician Abdi Ismail Yonis and engineer Suleiman Nuh Ali, were among a group of 13 scientists and engineers whose cases were investigated last fall during a visit to Somalia by a fact-finding group from the Institute of Medicine and the NAS.

Press, in his telegram, said that the imposition of the death sentences "will surely serve to curtail the possibility of future cooperation in science, medicine, education, and other fields between our two countries for many years to come."

Although the NAS mission was unable to get any reliable information on the condition of the prisoners, its Committee on Human Rights recently received lengthy statements reportedly handwritten by Yonis and Ali, which describe how their captors tortured them to make them sign confessions. ■ **C.H.**