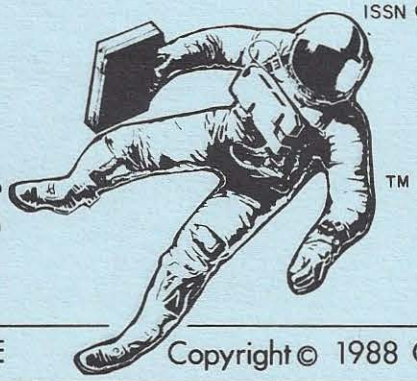
ISSN 0735-9314

THE COMMERCIAL SPACE REPORT



A MONTHLY NEWSLETTER ON FREE ENTERPRISE IN SPACE

Volume 12, No. 2 February, 1988

New Government Space Policy Opens Opportunities For Entrepreneurs
(Part Two of Two)

More details on the Reagan Administration's new space initiatives were released during the month of February. The details included clarifications of policies that were covered last month (such as space station privatization and the requirement that the government use private launch systems wherever possible), and policies which will be discussed in this month's issue (removal of resolution limits on remote sensing satellites, insurance liability limits, and more).

We'll begin with some news on the controversy generated by NASA's reluctance to pursue private solutions for near-term space research and manufacturing facilities (covered in last month's issue).

NASA To Lease Space On Private Space Station

On February 24, NASA announced that it would initiate an open competition, seeking offers to lease working space and services aboard a commercially-developed space facility. The lease period would be for five years, beginning in 1993. Lease terms, fees and conditions will be negotiated, and are, of course, subject to the future availability of Congressional authorization and funding.

NASA has set out specifications that the facility must meet. The facility must be launched as a single Space Shuttle payload, and provide 2,000 - 3,000 cubic feet of usable pressurized working volume. The facility will be checked out and serviced periodically by Shuttle crews, which will dock the facility to the Shuttle while servicing is being done. The rest of the time the facility will be in an unmanned, free-flying mode for periods of 4 to 6 months. At least 30% of the facility will be required to be available for commercial users above and beyond the volume leased to the government.

It is obvious that NASA's specifications for this facility fit Space Industries' Industrial Space Facility (ISF) like a glove (see last month's issue). This is not too surprising, since the entire leasing concept was developed at the urging of Space Industries in the first place. However, Space Industries is not necessarily the sure-fire competition winner that it may appear to be.

NASA's announcement has attracted interest from other companies as well, although no official statements have been made to date. These companies reportedly include Fairchild Industries, originator of the Leasecraft unmanned commercial free-flying space platform (*C.S.R.*, Feb. 1983, Nov. 1985); Rockwell International; McDonnell Douglas, which once proposed a space station project to NASA that might have delivered twice the station for about a third of the money (*C.S.R.*, Feb. 1984); and Third Millennium, Inc., designers of the Micro Van spaceplane (*C.S.R.*, Dec. 1987, pp. 5-6).

Spacehab Gets Boost From New Policy

Spacehab, Inc., another commercial space facility company, received a welcome endorsement of its efforts in the new space policy, which states that the Administration will make "best efforts" to launch Spacehab's Shuttle middeck module in the early 1990s.

The Spacehab module is a pressurized metal cylinder that would mount inside the Space Shuttle's payload bay, and connect to the Shuttle crew compartment via the Shuttle airlock. Occupying about a quarter of the payload bay, the Spacehab module would provide up to 1,000 cubic feet of additional Shuttle living and working space, and could greatly increase the amount of equipment space available to customers (*C.S.R.*, Oct. 1985, pp. 2-4).

Spacehab needed the boost. After the Challenger disaster the company found itself in competition for suddenly-scarce Shuttle payload manifest space. Towards the end of 1987, things began to look bad for the company. NASA was concerned about the effect of the loaded Spacehab module (which mounts directly behind the Shuttle cabin) on the Shuttle's center of gravity during reentry and landing. The space agency felt that the effort required to address this technical problem would detract from the struggle to make the Shuttle flyable again, and Spacehab seemed destined to take a permanent place on the payload manifest waiting list. Fortunately, NASA recently raised the weight limit the Shuttle is allowed to carry on landing, which apparently resolved this problem. Still, the additional Administration endorsement was welcome news.

Both Spacehab and the eventual winner of the free-flying platform competition will face further hurdles. A considerable amount of money must be raised from the private sector to build these space facilities (Space Industries says that the ISF will cost about $700 million to develop and construct, while Spacehab puts the price of two modules and ground facilities at $65 - 70 million).

A government lease agreement for part of the free-flying, man-tended platform will go a long way to facilitate financing arrangements for that project, but it won't all be smooth sailing. Money will have to be authorized by Congress to pay for the five-year lease arrangements, not just once but several times. The program could hit a fiscal brick wall at any time. In addition, to avoid subsidizing development costs and to protect the government, the money will be put in an escrow account until the private space facility company can deliver the service. Unforeseen problems or delays could cause the government payments to be held up, while any private financing runs out. Finally, as currently designed, such a facility will be totally dependent on the Space Shuttle, and another major problem with the Shuttle--resulting in another lengthy launch hiatus--would probably mean the end of the commercial platform company.

The Spacehab company claims that, although the government would be welcomed as a customer, government guarantees to purchase the company's service will not be essential to raise the financing needed to build the Spacehab modules. Still, like the free-flyer, Spacehab also depends completely on the Space Shuttle, and would also be vulnerable to any Shuttle problems.

These are only some of the risks that will be faced by the companies building the first commercial space facilities. However, similar risks are faced all the time by many other entrepreneurs doing business in the private sector, and the space platform companies should be no different.

In fact, it can be argued that these hurdles--in particular the necessity of relying on the private financing for development--may be beneficial. Companies operating under such conditions may produce results more practical and affordable than those produced by more traditional aerospace firms which often rely on a generous supply of government funding to cover less-than-frugal development programs.

Shuttle External Tanks Made Available To Private Industry

A third commercial space facility company, the External Tanks Corporation (ETCO), also got good news with the new space policy. The policy states that the Administration is making available for five years the expended External Tanks (ETs) of the Shuttle fleet at no cost to all feasible U.S. commercial and nonprofit endeavors, for uses such as research, storage, or manufacturing in space. NASA will provide any necessary technical or other assistance to these endeavors on a direct cost basis. If private sector demand exceeds supply, NASA may auction the tanks.

ETCO, an offshoot of the University Corporation for Atmospheric Research (UCAR), was founded in 1987 to explore the utilization of expended Space Shuttle External Tanks (*C.S.R.*, Mar. 1987). Last year the company signed a Memorandum of Understanding (MOU) with NASA to begin mutual studies on the feasibility and methods of transferring expended ETs to the company, and to work out the terms and conditions required.

ETCO's program has not generated the controversy at NASA that Space Industries has. There are several reasons for this:

First, as stipulated by the MOU, no NASA funds must be committed to the project, and any future costs to the space agency are expected to be minimal (an ET can be jettisoned into orbit rather than into a reentry burnup trajectory at little or no payload cost to the Space Shuttle).

Second, the space policy does not specify a particular company to receive the tanks. A NASA objection to the Space Industries lease proposal was that it was noncompetitive. The objection was overcome by opening the free-flyer lease contract for competition (as described earlier in this issue).

Third, since 80% of ETCO is owned by the non-profit UCAR, NASA's support can be viewed as aiding a research organization, a position NASA finds more comfortable than subsidizing, or appearing to subsidize, a private company.

ETCO is studying many potential uses for an orbiting External Tank, particularly those which capitalize on the large amount of pressurized volume available (over 70,000 cubic feet). An ET could be modified into various types of observational instruments (studies are already under way at NASA to investigate use of the hydrogen tank as a gamma-ray imaging telescope). The roomy tank could be converted to a greenhouse, to study closed ecological systems, or an orbital "drop tower," which could provide experiments with a microgravity environment that would be better, and would last longer, than that available aboard smaller facilities. Outfitting the orbiting ET for these or other projects is expected to run up to $200 million, even assuming ETCO obtains the tanks for free.

ETCO has made a proposal to NASA on a near-term method of utilizing External Tanks with little modification or investment required. Automated experiments could be mounted in the intertank portion of the External Tank (the intertank is that part of the ET structure that connects the liquid oxygen and liquid hydrogen tanks). No other changes would be made to the ET or to the Shuttle's mission profile. Upon being released on a trajectory to reenter the atmosphere, the instruments and experiments on board the intertank would have from 10 to 45 minutes of microgravity (depending on the trajectory) to transmit data and results back to Earth before the ET burns up. This is better performance than any existing sounding rocket can offer, and ETCO hopes that response to this program will indicate the marketability of its more advanced concepts.

Already on good terms with NASA, ETCO can take the endorsement of the space policy as icing on the cake, but the policy is encouraging other organizations to take an interest in External Tank facilities. ETCO is exploring the possibility of acting as a broker for these organizations. ETCO feels that a third party could save money by dealing through ETCO, rather than directly with NASA.

Restraints Lifted From U.S. Earth Observation Satellites

The Administration space policy will remove a 10-meter lower limit on the resolution of U.S. civilian remote sensing satellites, a move applauded by the media and the U.S. earth observation satellite industry. The new ruling means that U.S. satellites will be allowed to photograph the Earth's surface with sufficient magnification to pick out details smaller than 10 meters in diameter.

The 10-meter limit on resolution was set by the Carter Administration as the request of the U.S. Department of Defense (DOD) and the Central Intelligence Agency (CIA), which feared that more detailed images would reveal military secrets (the resolution of military satellites is classified, but is considerably below 10, or even 5 meters). Current Landsat resolution is 30 meters, and--despite the unofficial and probably illegal nature of the limit--neither the satellite companies nor the media were willing to risk the expense of building and launching better satellites in the face of Federal disapproval (C.S.R., April 1987, pp. 1-4).

What changed everyone's mind was competition from foreign observation satellites. The French Spot satellite already has a resolution of 10 meters, and in January, Soyuzkarta, a Soviet agency, began marketing photographs of the Earth (with the exception of the U.S.S.R., of course) with resolutions of 5 meters. The idea of a 10-meter limitation on U.S. satellites to protect U.S. secrets began to look pretty silly, and when agencies such as the U.S. Geological Survey began investigating purchasing Soviet imagery, the 10-meter limit died a quiet death.

The new freedom will open wider markets for U.S. earth resources satellites, and new markets for "mediasats," satellites designed to photograph features on the Earth's surface specifically for use by news organizations. Such satellites are potentially quite lucrative in an industry that spend hundreds of millions for exclusive rights to major news events like the Olympics.

Last October, the Earth Observation Satellite Company (EOSAT) ran a survey of news organizations on 5-meter imagery, investigating the potential market for high-resolution Earth imagery intended specifically for the media. At the time, this seemed optimistic--the 10-meter limits were still in effect. Now, EOSAT hopes to fly the Satellite Tracking And Reporting sensor (STAR) on a satellite sometime in the 1990s.

Liability Limits Proposed For Private Space Companies

Part of the new space policy addresses the insurance concerns of the U.S. commercial launch industry, which currently uses Federal ranges for launch sites. Some private launch companies have complained that the third-party liability insurance requirements have been onerous (Martin Marietta's launch site agreement with the Air Force required the company to purchase the maximum amount of liability insurance commercially available). The U.S. launch companies also have pointed out that subsidized foreign competitors in Europe, China, and the Soviet Union, are largely free of such constraints, and are therefore more competitive.

The insurance problem is being considered independently by both Congress and the Department of Transportation (DOT). In Congress, Bill HR 3765, introduced by Rep. Bill Nelson (D.-Fla.) and 21 other House members, would modify the Commercial Space Launch Act of 1984 to, among other provisions, set caps on third-party liability insurance requirements. The bill would make $500 million the maximum amount of liability insurance that a commercial launch company would be required to buy. Damages over that amount would be covered by the DOT. Launch companies would also be required to purchase insurance covering damages to government property at the launch site, up to a maximum of $100 million.

The Administration, in the new space policy, follows the recommendation of the Department of Transportation. The DOT is calling for a $200,000 cap on non-economic (punitive, or "pain and suffering") damage awards to individual third parties resulting from commercial launch accidents (there would be no limits on economic damages). Like Congress, the DOT would also set limits on liability for property damage to government facilities used for commercial launch activity (incidentally, none of these proposals is intended to address insurance covering financial losses in case of loss of a launch vehicle or payload, a whole different subject *C.S.R.*, Sept. 1985, p. 5).

There is controversy between Congress and the Administration over these two proposals, particularly over the $200,000 third-party liability limit set in the DOT proposal, which would require major changes in tort (involving wrongful act, injury or damage) law. However, between the two ideas some compromise will no doubt be worked out.

Whatever the final form of the government's policy on commercial launch insurance, unless it is considered carefully it could, despite perceived short-term advantages to the commercial launch industry, turn out in the long run to place the industry in a position which would be both financially detrimental, and morally indefensible.

A legal requirement that a commercial launch industry carry a certain, limited amount of insurance (as in the House bill) is--although not ideal in a free market--acceptable. However, a legal upper limit on liability (as in the DOT proposal) is not.

These statements may seem inconsistent, but that is because of the confusion between "liability" and "coverage." Liability is a moral and legal obligation to repay someone for damage you have caused. Insurance coverage is the means one uses to fulfill that obligation. Under normal circumstances, the liability of an individual or company is unlimited. However, this does not mean that an infinite amount of insurance coverage need be purchased. The actual amount of coverage required is usually calculated by insurance companies and others based on reasonable predictions of hazards based, in most cases, on past statistics. If the estimate is accurate, it will cover all but the most unlikely liability situations.

For example, any major commercial airline company in the U.S. (operating aircraft containing 60 or more passenger seats) is currently required by the Department of Transportation to carry $20 million in third-party property and bodily injury insurance, along with an additional $300,000 per passenger seat to cover damages to riders. There is no upper limit on liability, but, given the generally excellent safety record of the airline industry, this relatively small amount of insurance is considered sufficient for nearly all circumstances.

No industry in the U.S. has an upper limit on liability, except the nuclear power industry. Dr. Petr Beckmann, in an article in the October, 1987 issue of his newsletter *Access To Energy* (Box 2298, Boulder, CO 80306, $22.00/year, back issues $1.50), describes the effects of the Price-Anderson Act which limits, by law, the liability of the nuclear industry (to a maximum of $7 billion [!] in a recent version).

Despite the original claimed intention of the Act, to assist the nuclear industry in getting started, the actual results have been generally detrimental. Not only has the stratospheric liability limit reinforced the impression of the U.S. nuclear industry as unsafe, immoral, and uninsurable by normal means, but the assumption has also been made--and requirements set forth--that the industry must be insured up to that limit. These distortions of normal insurance practices are ridiculous in light of the actual safety record of the nuclear power industry, which far exceeds that of any other power source, and certainly exceeds that of the more conventionally insured airline industry.

The launch vehicle industry should not permit itself to be set apart from other transportation industries in the area of liability law. To accept "special" treatment

from insurance regulators is to risk winding up in the same ghetto as the nuclear power industry. A launch vehicle, even a large one, is not inherently more dangerous to third parties than an airliner would be in an accident. Airliners, which can be extremely destructive in a crash, routinely fly over heavily populated areas in the hundreds without anyone raising an eyebrow, while most launch vehicles currently operate in fewer numbers from relatively remote launch sites, and usually over the open ocean. Despite this reasoning, liability insurance for launch systems will be expensive. Insurance companies live by the statistics, and launch vehicle reliability statistics haven't been all that impressive of late.

Without special favors from the government, launch vehicle companies will need patience and, for a while, a lot of bucks. Eventually, as the industry matures and better, more reliable launch systems are developed, the day will come when space vehicles will--like airliners--be treated by insurance companies, regulators, and everyone else, as a routine, reliable means of transportation.

* * *

Update: DARPA Small Launch Vehicle Program

The Defense Advanced Research Projects Agency (DARPA) has finally issued an official request for proposals (RFP) to build a small expendable launch vehicle capable of placing up to 1,500 lbs. in low earth orbit. DARPA has been working on this project for several months, while private launch vehicle companies waited eagerly for the chance to present their ELV concepts for the DARPA mission (*C.S.R.*, Nov. 1987, pp. 1-2).

The RFP was issued March 1, and the deadline for submitting proposals is March 31. The following month, four $300,000 study contracts will be issued to refine the design concepts and their associated development costs. In August, one of the four concepts will be selected for development.

Until next time,

Tom Bz

The Commercial Space Report (C.S.R.) is published monthly, and endeavors to report and analyze developments in the field of private initiatives in space transportation and exploitation.

Subscription rates are: U.S., Mexico, Canada: 1 year–$15.00, 2 years–$28.00, 3 years–$39.00. Foreign Air Mail: 1 year–$20.00, 2 years–$38.00, 3 years–$54.00. Back issues are available at $1.50 each from September, 1977. Xerographic copies may be substituted as stocks are depleted.

Address all correspondence to: *Commercial Space Report, P.O. Box 60547, Sunnyvale, CA 94088.* Editor: Tom A. Brosz. Tel: (415) 965-8666. Comments, ideas, or requests for information are welcomed, as are any items which may be of interest to our readers.