

# How 'private enterprise' could kill the American space program

by Marsha Freeman

Over the past two years, every national magazine and newspaper has printed at least one front-page story on the commercialization of space. Even the Reagan White House has been extolling the virtues of private investment in space technology.

Of course, the space program continues to give a terrific boost to the civilian economy by enhancing productivity. Whole new industries have been stimulated by NASA's research activities. This is not what is always meant by "commercialization of space." Rather, some want to develop space on a pay-as-you-go basis.

The blueprint for this sabotage of the U.S. space effort comes, not surprisingly, from the Heritage Foundation. These so-called, self-styled conservatives will be glad to let the Soviets, not to speak of our NATO allies and the Japanese, outstrip us in space rather than accept government subsidies for space development.

## Making the Shuttle 'compete'

The question of the viability and very existence of our Space Shuttle system has now been raised by the fight going on over the price that NASA will charge Shuttle customers in the next decade. This Shuttle pricing-policy question has been defined by a series of policy decisions motivated by the idea, pushed by the Heritage Foundation, that once such a system is operational, the government should remove all subsidies, forcing it to pay for itself.

Left unsaid is the fact that over 100 years after the invention of the automobile, the federal government today spends more money (over \$12 billion this year alone) to subsidize that industry through the national highway trust fund, than it does on the entire civilian space program.

The more fundamental question policymakers have to answer is whether or not the nation should have a Space Shuttle system, regardless of the supposed "cost."

The official policy of the Reagan administration is that commercial Shuttle customers should pay to recover the total cost of each of their space launches. This pricing policy was supposed to go into effect in 1986.

In 1982, when the 1986-88 Shuttle launch price schedule was being put together, the Reagan administration decided to throw overboard this "cost recovery" idea, recognizing

that in the real world, the Shuttle would be totally undercut by the French Ariane, if its price were to dramatically increase.

The more fundamental question is, why should the Shuttle system have to pay for itself at all? In a statement before the Subcommittee on Space Science and Applications of the House Committee on Science and Technology last August, William A. Anders addressed this question, as a representative of the NASA Advisory Council:

"The STS should be considered a valuable national resource due to its unique capabilities to provide for manned space flight, defense missions, space science support, and research and technology development in the space environment, as well as its special capabilities for satellite retrieval and spacecraft servicing. The total costs associated with this national resource value should not be charged to the Shuttle's launch service users."

To make his case clear, Anders continued, "History clearly shows that all transportation modes—ships, rail, truck, air—have required and still receive government support (subsidies) to achieve the benefits of the environments they serve. Government support to the construction of thousands of miles of canals made possible an extensive network of inland waterways to stimulate commerce. The railroads, which linked the U.S. from coast to coast, received land grants of over 180 million acres in the 22 years from 1850 to 1871, and were also subsidized for carrying the mail. Why should space transportation be any different? Indeed, its size and complexity suggest government support is even more appropriate and important!"

The House subcommittee itself has expressed reserve at this idea that the Space Transportation System should pay for itself. In a report issued in October 1984 titled, "Review of Space Shuttle Requirements, Operations, and Future Plans," the statement is made: "The Subcommittee is concerned that the adoption of a pricing policy (such as total cost recovery) that results in a price significantly above the current price of \$71 million per flight (constant 1982 dollars) could do substantial harm to the continuing programmatic and economic viability of the Space Shuttle program."

Shuttle pricing policy for 1986-88 is based on industry paying for only out-of-pocket costs to launch their payloads. This has already raised Shuttle prices from \$38 million to

\$71 million in 1982 dollars.

The administration is still saying that full cost recovery, which would include the price of not only consumables for the mission, but part of the capital cost of NASA's facilities, will be the basis of an increased Shuttle price past 1986.

### **If the free traders win**

The Republican leadership of the current Congress has jumped aboard this "free enterprise" bandwagon by stating in their January 1985 policy paper, "Ideas for Tomorrow, Choices for Today," that the government should "adopt a policy of recovering the full cost of Space Shuttle services from commercial users, and encourage development of alternative launch services by private business."

In 1981, Richard Speier, author of the Heritage report, *Agenda for Progress*, stated at a scientific conference that the government should "not make decisions on how to get anywhere" in space, but should "purchase the results" of whatever private enterprise decides to develop in space.

Apparently, some people do not learn from past history. In 1973, NASA dropped out of advanced communications-satellite technology research—after the government insisted that the private sector, which admittedly benefits from the technology, should pay for it.

In 1979, NASA got back into communications R&D, after France and Japan had pulled ahead. The same experience in aeronautics research for the aircraft industry left the United States behind foreign competitors.

If current policies are implemented, there is a good likelihood that, three years from now, the Space Shuttle will be limping along, flying less and less often because a 25-year-old, expendable launch technology has been artificially extended beyond its useful lifetime. There are many opportunities for private industry to invest and make money in space, but sabotaging the development and use of the Space Shuttle will be the quickest way to shut off that potential.

### **The competition**

When the Shuttle was beginning its test program, the government made the decision that the space agency, NASA, would phase out its production of expendable vehicles, since all government launches would be on the Shuttle, making use of its unique capabilities. This foolish decision was based upon the criteria of cost cutting. It followed the previous stupid decision by the Carter administration that the Shuttle would be the only launch vehicle for the military. In February 1984, Defense Secretary Weinberger reviewed that policy and decided that this would compromise national security.

Although the Shuttle remains the primary launch vehicle for the U.S. military, in case of national emergency, the Air Force should not have to wait weeks for a Shuttle to be readied for launch. In a combat situation in space, who would decide to send a Shuttle orbiter with a crew of astronauts on board into the range of fire?

On May 16, 1983, President Reagan released his Presidential Directive on the Commercialization of Expendable Launch Vehicles as NASA was now out of the ELV business. The Department of Transportation was named as the government agency that would oversee and encourage the private production of ELVs.

Transportation Secretary Elizabeth Dole stated two days later in testimony before the House Subcommittee on Space Science and Applications, that her agency could transfer this industry to the private sector effectively, by virtue of the department's prior experience in deregulating the aviation, rail, and trucking industries. Considering the current state of these deregulated industries, this statement should have given the Air Force, which needs the expendable rockets, the willies.

One major problem which "commercializing" advocates do not discuss is the fact that the U.S. will definitely be

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undersold by the French, unless government subsidies allow for competitive pricing policies. The idea that the French can be convinced to sabotage their space program by putting it on a pay-as-you-go basis is chimerical to say the least.

The Ariane rocket is being subsidized by the French government. So much for "free enterprise"! Ariane has offered foreign customers preferential credit arrangements, long-term payment schedules, and has simply underbid the Shuttle and U.S. ELVs to get business. Why shouldn't they?

The Europeans spent more than \$1 billion developing their Ariane launcher, which they decided to go ahead with when NASA announced it was going out of the ELV business. It will be years before Ariane can show a profit, and the Europeans, of course, are going to subsidize it until then. All forms of national transportation, both here and in Europe, were either subsidized by governments until they became economical, or have remained government owned up until the present day as a necessary national investment.

These were the rules of the game when the U.S. companies entered the market with their expendable vehicles. Yet, Transpace Carriers, Inc., which is trying to market the Delta

launch vehicle, filed a petition on May 25, 1984 under the Trade Act of 1974 alleging that the European Space Agency is subsidizing the satellite launch services of the Ariane.

Interestingly, McDonnell Douglas, which is the builder of the Delta vehicle, did not bid on commercializing it, because they did not think the market would be there. Instead, McDonnell Douglas is working with NASA in developing new technologies to enhance the capabilities of the Space Shuttle.

### **Will U.S. defense capability be in trouble?**

The Air Force has access to an inventory of 33 Titan and Atlas expendable vehicles, which it will have to buy from this "deregulated" ELV industry. For national security's sake, one hopes that the companies do not suffer unforeseen difficulties, which could leave the Air Force without launchers.

Beginning in 1989, however, the military will need a greater payload capability than this current line of ELVs can deliver. The largest ELV, the Titan 34D, can carry 4,000 pounds into geosynchronous orbit. By the end of the 1980s, Milstar and other military satellites will push this requirement up to 10,000 pounds. The Air Force will regain control over this national security capability, by funding the development of next-generation ELVs.

The Strategic Defense Initiative, and also NASA lunar development missions, could easily require 100,000-250,000 pound payloads to be delivered into low Earth orbit. Since this could not be done by scaling up twenty-year-old ELV technology, the smartest path, even for the 10,000-pound interim requirement, would be to develop Shuttle-derived technology.

The U.S. military has been put in the position of having to depend upon the private sector for a crucial part of its access to space. But the companies who have undertaken this venture are not primarily depending upon the military for business.

### **Is it really a subsidy?**

The most radical position against continuing government support to the Space Shuttle and Rocket Launch Programs, has been taken by Jennifer Dorn, the director of the Office of Commercial Space Transportation in the U.S. Department of Transportation. In a speech before the National Space Club in Washington on Sept. 26, 1984, Ms. Dorn stated: "It has been our consistent policy to seek fair trade in open world markets so that U.S. industry can exploit their competitive advantage, rather than to promote continued subsidies and government participation in those markets.

"Thus, this administration has committed to full cost recovery STS pricing for foreign and commercial payloads. At prices reflecting average total costs, the loss of all potential foreign and commercial Shuttle flights to U.S. commercial ELVs, would have a minimal impact on the total cost to the federal government."

Beside the fact that commercial payloads lost from an "unsubsidized" Shuttle would go to the subsidized Ariane, and not to U.S. ELV manufacturers, the latter part of Ms. Dorn's statement borders on the incredible.

According to testimony before the House Space Subcommittee by Jesse W. Moore, NASA's Associate Administrator for the Office of Space Flight, the cost of each Shuttle mission would increase astronomically as the number of payloads decreased. If all commercial payloads were pulled off the Shuttle and onto ELVs, the money from industry that now goes to support Shuttle operations would be lost.

According to Mr. Moore, if the Shuttle made four flights per year, the cost per flight would be about \$350 million. Doubling the rate to eight per year brings the cost down to \$197 million each. At the projected NASA rate of 24 flights per year, each mission costs \$91 million. The fixed cost of the orbiters, the launch pads, personnel salaries, and hard-

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ware is the same, no matter how much it is used. The more often the system is used, the cheaper it gets.

The real result of raising Shuttle prices to make it "pay for itself" would be to vastly increase the cost to the taxpayer of the missions that NASA and the military are going to perform with the Shuttle. These missions cannot be done on ELVs.

In addition, the price would prohibit private industry from ever taking advantage of the Shuttle's capabilities. Mr. Beggs, the NASA Administrator, pointed this out under questioning by the House subcommittee last summer. "Total cost recovery," he stated, "would provide for the commercial customer to pay a pro rata share of the total costs to the U.S. government. However, the resulting price may be non-competitive for the current spacecraft satellite customers and might result to be [sic] too expensive to encourage the developers of new space-based products. [Also,] a significant increase in pricing may actually increase the cost of maintaining the Shuttle program depending upon the number of customers lost."

"Free market" enthusiasts have insisted that the govern-

ment is subsidizing commercial Shuttle launches by not charging customers the full cost of each flight. Though the Shuttle should be subsidized by the government because it is a "valuable national resource" without being tied down to how much everything costs, there is even a question as to whether or not this charge has any truth to it.

As Dr. Barbara Stone from NASA has pointed out, it now costs NASA \$43 million to add a commercial satellite mission onto the Shuttle's government flight schedule. The Shuttle is going to be flying anyway to fulfill its military and NASA missions.

But industrial users are not paying \$43 million per flight. They are paying at a rate of \$71 million per mission. Therefore, every commercial customer is actually contributing \$27.7 million per mission to the base costs NASA bears for the entire Shuttle system. Dr. Stone has raised the question, who is subsidizing whom?

The price that the government charges commercial customers should be based on the Shuttle services that they require, and on the commitment to encourage industry to learn how to use the Shuttle system to their own best advantage.

If the Reagan administration stubbornly decides to stick to the idea that by 1989 Shuttle customers will have to bear the full cost of missions, it will only force the government to "subsidize" the Shuttle by paying exorbitant prices for military and NASA payloads, and it will undermine the development of real space industries.

### **Is there a role for industry in space?**

Absolutely! Projections by the Center for Space Policy, North American Rockwell, and others indicate that by the year 2000, commercial space activities could generate over \$50 billion in business. The majority of this business will be in the area of space-based manufacturing where the processing of materials can be done in the microgravity of space.

Companies are already testing out new equipment to take advantage of this unique environment aboard the Shuttle. The purification of pharmaceuticals to cure diseases, manufacture of near-perfect and larger crystals, production of metal alloys that do not exist on Earth, are each potentially multi-billion-dollar space industries of the future.

After testing on Shuttle flights, companies will be able to build unmanned factories to produce commercial quantities of these materials. These factories will be tended by Space Shuttle crews. With the operation of the space station in the early 1990s, whole "industrial parks" will be possible in space.

Space-processed glass, gallium arsenide crystals for semiconductor use, pharmaceutical products, commercially owned and operated factory platforms, and other industries in space provide millions of dollars of investment opportunities in space.

Why fight over the \$1 billion or so which will be spent

on launch vehicles? Let's put our resources into making sure there is a robust Shuttle fleet, keeping prices in step with what industry can afford in order to take advantage of this new access to space, and lay the basis for a space-station program that will open up not only Earth orbit for space industrialization, but also the Moon, Mars, and beyond.

### **ELVs and 'free enterprise'**

The companies that have gone in to the business of marketing old expendable vehicles developed by the government have stated that their projections show that there will be more commercial-communications satellite launches over the next 10 years than the Space Shuttle alone could handle. These projections are quite wide-ranging—anywhere from 100 to 300 satellites by the mid 1990s.

Second, NASA plans to be flying 24 Shuttle missions per year by the end of this decade. Of those, one-third will be military, one-third will be NASA science and technology payloads, and one-third will be U.S. and foreign commercial payloads. Each mission could launch at least two communications satellites. Even if there are 30 commercial satellites to launch each year, which is wildly optimistic, the Shuttle can easily handle at least half of them.

Ariane is now projecting 8-10 flights per year for the same time frame. That leaves only a half-dozen "overspill" flights for a potential U.S. ELV manufacturer, if the very optimistic estimate of 300 satellites is used.

In addition, the trend in communications-satellite technology would actually lead to fewer, rather than more launches in the future. Open slots in the required geosynchronous orbit are becoming filled rapidly. Satellite designers are looking at clustering individual satellites on unmanned platforms.

These platforms could be assembled on the Shuttle, and then sent off to their orbital slots. As satellite technology becomes more and more complex, manufacturers will increasingly require the check-out and repair services which only the Shuttle can offer. In the 1960s and 1970s, 78 of 131 total satellite failures were related to launch or early-mission malfunctions. Those problems are correctable using a Shuttle crew and orbiter.

Over the next decade, the commercial communications satellite industry should be learning how to use the new capabilities of the Shuttle system, and then the space station, to enhance the multibillion-dollar business they do. Expendable vehicles are a dead-end technology which offers no real commercial advantages for the future. When the aerospace industry initially had meetings with NASA representatives on privatizing the ELVs, NASA officials warned the industry that they did not see how they could make money unless ELV costs were subsidized.

Rather than trying to create an ELV industry in this country, the White House should be encouraging the commercial satellite industry to start designing their future spacecraft to take advantage of the services of the Shuttle.