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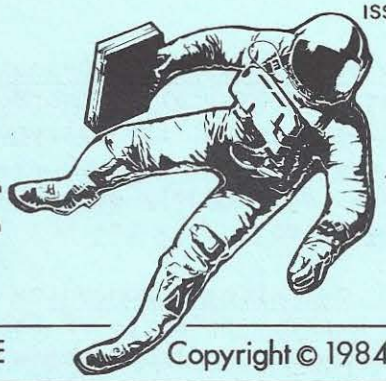
THE COMMERCIAL SPACE REPORT



A MONTHLY NEWSLETTER ON FREE ENTERPRISE IN SPACE

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Where Are The Space Transportation Investors?

New private launch vehicle companies, representing the best chance of opening up space at a reasonable cost, are suffering a severe shortage of startup capital.

Investors are becoming leery of space projects, and not just those proposed by the new space transportation entrepreneurs from companies like Pacific American Launch Systems, Starstruck, Third Millennium, Inc. (MMI) and Truax Engineering. Even the more "mainstream" companies such as Orbital Sciences Corp. (OSC), which has raised private financing and is working closely with the National Aeronautics and Space Administration (NASA), are being watched closely by the professional investment community.

The apparent intent is to use these already-funded operations as a sort of "litmus test." Success or failure of these companies, in particular the highly-visible OSC venture, could dictate the future attitude of the entire investment community towards space commercialization in general. So far, the attitude toward these mainstream companies has begun leaning in the direction of skepticism.

Needless to say, if space transportation companies using the familiar NASA approach are being greeted with caution, then the often radical approaches of the entrepreneurial companies, often derided by NASA, are going to receive even less sympathetic treatment from investors.

Regular readers of this publication have seen myriad examples of the opportunities for profit in space commercialization, particularly in the area of space transportation. Why then this caution? What are some of the major reasons for this reluctance on the part of the professional investment community to invest in space, and are they valid ones?

The overiding problem is that the investment community is not familiar with the potential of space commercialization to the same degree as the more technically-oriented entrepreneurs (it can also be fairly pointed out that many entrepreneurs are also treading new ground when dealing with the professional financial community, but that's another article). Therefore, let's look at specific investor objections from the point of view of the investor unfamiliar with space commercialization, along with some responses to those objections:

Market Problems:

To the typical investor, there is no obvious market for commercial space transportation with the outstanding exception of delivering communications satellites. The many other possibilities for commercial payloads (which will provide the customer base for commercial launch systems) are at present just so many "paper studies" with which the investor is largely unfamiliar, and in any field, paper studies can't hold a candle to a proven market.

The exception of communications satellites has been mentioned. The operational (or near operational) mainstream space transportation companies have selected the geosynchronous satellite delivery market as their prime target. However, the government space programs of the U.S. and Europe, characterized by the Space Shuttle and Ariane, are largely absorbing the customer demand in this area, due primarily to price subsidies. This has not left much to go around, with predictable results.

The mainstream companies are not doing well in the communications satellite delivery market, in spite of initial financial advantages over the newer, entrepreneurial companies. Among these mainstream companies are those which are privatizing government launch vehicles and have already had all of their development costs absorbed by the taxpayer. They include Transpace Carriers, Inc. (privatizing the Delta launch vehicle), General Dynamics (Atlas/Centaur), and Martin Marietta (Titan 34D). Nevertheless, they are scrabbling for satellite customers. Transpace Carriers, for example, has not yet found a Delta customer, and all government support for the Delta program was shut off in October. OSC has also not yet located a customer for its Transfer Orbit Stage, despite intense technical support and flight subsidies from NASA and the Space Shuttle organization.

With this to go by, an investor can hardly be blamed for avoiding those entrepreneurs with launch vehicle designs barely off the drawing boards.

To counter this, an investor should be shown that existing launch systems are still enormously expensive despite privatization. Companies working with government equipment or building systems the way governments have always built them will do nothing to bring costs down. On the other hand, the new launch vehicle designs proposed by the entrepreneurs have the potential for drastically reducing launch prices far below those of even subsidized existing launch systems. This would break the payload market wide open and allow many of the so-called "paper study" payload applications to become reality.

High Capital Requirements:

The investor sees the development of a new launch vehicle system as something stupendously expensive, which would absorb at least a billion dollars before a product rolls out ready to turn a profit. This estimate is derived from the only obvious examples that the investor has to go by: projects developed by NASA and other government organizations.

In fact, a launch vehicle need not cost billions to develop. The highest development price in the group of space transportation entrepreneurs mentioned above is $750 million for Third Millennium's "Space Van," a completely reusable winged launch system. Pacific American puts the R & D cost of its reusable "Phoenix" at less than $200 million. The expendable or partially reusable launch systems proposed by the other companies would cost even less to develop.

Still, although something in the $100 million range may be cheap by aerospace (particularly government aerospace) standards, it is nevertheless a considerable quantity of money for most of the investment community. The investor must compare this not only with less expensive earth ventures, but with less expensive space ventures as well (normally those involving payloads only).

High Risks and Long Waits for Payoffs:

Another thing that the investor must consider in the financial equations is the perceived high risk of developing an entirely new space transportation system, a technical problem with which most investors are totally unfamiliar. Again, the only examples available to the investor are the enormously complex projects developed by government organizations.

In addition to this, a launch vehicle endeavor may not break even or make a profit for years after money begins to be poured into it, although the eventual profit stands to be enormous (many entrepreneurs place this time lag at less than three or four years, but the example which still hangs before the investor is the ten-year lead times typical of the government). It is difficult to fault an investor if he wants to put less money down for a smaller profit in a shorter time.

It is interesting to note at this point that these restrictions also apply to another industry which is not only regularly funded, but is attractive to investors and the foundation of huge companies. This would be the oil industry. Consider the fact that hundreds of millions of dollars are put into risky oil ventures every day. Millions can be spent to drill wells that may or may not pay back years down the road. Yet, this is considered an ordinary venture by most investors. If money is available for this, why not for space transportation? One answer is the familiarity of the investor with this industry and its market, and to another factor, discussed below:

Regulations, Taxes, and Government:

The rules in the oil industry are for the most part set down in black and white. The laws and regulations covering oil ventures, although complex, probably unnecessary, and subject to the whims of government, are at least there for the investor to incorporate into his calculations. In other words, the bureaucratic territory the investor must negotiate may be hostile, but at least it is reasonably well-mapped, and there are armies of oil lobbyists in Washington to keep a watchful eye on things. In addition, it is commonly known that there are numerous tax benefits for those investing in the riskier areas of the industry.

This has not been true of the space industry. The regulatory environment has been too cloudy to reassure a large-scale investor that the rules are not likely to change drastically in midstream. The financial risks are difficult enough for an investor without worrying about what some bureaucrat might do in an area where the rules are undefined. And, as far as taxes go, the tax codes to date have not provided the incentive to invest in space that they have for numerous earthbound endeavors.

This has been changing rapidly--the Commercial Space Launch Act (H.R. 3942), signed recently into law by President Reagan, goes a long way towards putting down on paper the government policy on commercial space transportation (it remains to be seen whether the resulting regulations will help or hinder the industry). In addition, progress is being made towards creating a beneficial tax environment for space ventures. When this process is completed, the investment climate may improve.

Although regulation of yet another new sector of human activity may rankle some, remember that we are looking at this from the viewpoint of a typical investor. Unfortunately, to many such investors an unregulated industry is too chaotic an environment to risk money in. Entrepreneurs will probably just have to tolerate the regulations and take some comfort in the tax benefits which are also coming along.

There are other reasons why investors are being cautious about commercial space transportation. For example, the artificially low prices (compared to real costs) of government systems like NASA's Space Shuttle are a factor in discouraging investment in potential Shuttle competitors, but this subject has already been extensively discussed in past issues (C.S.R., April, 1984 pp. 1-4).

As was stated in the beginning, the main problem is one of educating an investment community unfamiliar with space on the benefits (financial and otherwise) of capitalizing companies that will bring commercial space tranportation into a new era. This will not be easy. High-technology investors, despite their image as

pioneers on the cutting edge of human progress, are in reality quite conservative. For another example, take a look at another fledgling high-tech industry:

Private Fusion Reactor Companies: Similar Problems

The same investment problems plague private companies attempting to develop nuclear fusion reactor technology. The field of fusion energy is in many ways similar to the field of space transportation. Both involve advanced technologies promising a major advancement in human progress. Both require large amounts of money up front, and have long waiting periods before payback. In both cases the potential payback is enormous. Finally, both are competing with the government and fighting the image of their technologies as exotic and expensive concepts that only a government can develop.

An excellent article on this subject titled "Fusion For Profit?" appears in the November, 1984 issue of High Technology magazine. It discusses the history of International Fusion Energy Systems Co. (INESCO), a private company in La Jolla, Calif. founded in 1976 by Robert Bussard (better known to readers as the originator of the interstellar propulsion system known as the "Bussard Ramjet").

INESCO proposed a design for a Tokomak-type reactor which was considerably cheaper to develop and build than the concepts proposed by government fusion labs. The company, turned down by the Department of Energy for funds, was financed during its design phase by a variety of sources including about $15 million from Bob Guccione, publisher of Penthouse and Omni magazines. INESCO needed about $200 million to build and test five reactors. It didn't get it. INESCO is no longer in business, having collapsed in August of this year.

The story behind INESCO's problems is too long to detail here. However, the parallels between the fusion company and private space transportation companies are striking. Equally striking are the similarities between the obstacles encountered by both industries, ranging from the fears of the investment community to the hostility of the government fusion interests. The article is highly recommended.

Shuttle Recovers Satellites

The NASA Space Shuttle Discovery returned from space carrying the communications satellites Palapa B-2 and Westar 6 which had been derelicts in a useless orbit. The recovery was an opportunity for NASA to showcase the capabilities of a manned space system, and the mission was a great success from this standpoint (more on this in next month's issue).

The financial results of the mission, however, were not as clear-cut. As usual, the heavily-subsidized flight was a major blow to the American taxpayer, as mentioned in an earlier issue of the C.S.R. (May 1984, pp. 1-2). However, let's overlook the subsidy for now and examine the mission from the point of view of the customer. Some details:

For the original mission, the satellites were insured for a total of $180 million ($105 million for the Westar 6, and $75 million for the Palapa B-2) by a number of underwriters through Lloyd's of London. After the satellites were lost in the wrong orbit, the insurance underwriters paid the customers all of the $180 million. The recovery mission was seen as a way for the insurers to recoup some of the loss by reselling the satellites after recovery.

The cost to the insurers of the recovery mission was $5.5 million per satellite, of which $2.75 million was slated for repairs to the satellite by Hughes, and the other $2.75 million was the price charged by NASA (which is where the taxpayer got it in the neck).

So far, prospects look good for the sale of the used satellites. It will probably be easier to sell the Palapa B-2, which needs fewer repairs than the Westar 6. The major reason for this is that Shuttle launch prices are due to go up in 1986. The Palapa could be repaired and ready for relaunch before this, and could be launched for about $10 million. The Westar would probably not be ready for launch until 1986, when the price for launch could be $18 - 19 million.

The insurers expect to get $50 - 60 million from the resale of the two satellites. Net loss to the insurers ($60 M - [$180 M + $11 M] = $131 million. Certainly better than having to eat a $180 million loss, but not by much. Despite this, the recovery was a cause for celebration at Lloyd's of London, where the old Lutine Bell was rung twice. The Bell, salvaged from a British bullion ship which sank in 1799, is traditionally rung once for the bad news that a ship has been reported missing, and twice for the good news that a ship thought missing has turned up.

Lloyd's could use all the cheer it can get. Total payouts for 1984 on satellite insurance alone are running at about $282 million, which includes not only the $180 million from the Palapa and Westar, but another $102 million paid out for the loss of Intelsat V (F-9) which was lost when the normally reliable Centaur stage of an Atlas/Centaur rocket failed to boost it into geosynchronous orbit. So, now the Intelsat is, in its turn, languishing in a useless low orbit. It could possibly be reached by the Shuttle, but no plans are underway for recovery.

Under the circumstances, insurance rates for satellites are not going to be going down simply because of the satellite rescue. In fact, they are probably going up even more. Premiums used to run about 5 - 10% of the insured amount. Rates are now expected to run to 15 - 20% or even higher.

As an aside, this development represents another blow to space transportation investment: Skyrocketing insurance prices are beginning to make communications satellites look financially unattractive, and companies will stop buying and launching them. And, as noted earlier, to the untutored investor communications satellites represent the only obvious market for space transportation systems.

In any case, such rescue missions of communications satellites will be few and far between in the future. Rarely does a communications satellite fail in an orbit low enough to be reached by the Space Shuttle. Satellites which fail after being placed into geosynchronous orbit are beyond the reach of any existing recoverable spacecraft. Operations in geosynchronous orbit will require either some form of manned orbital transfer vehicle to work with the Shuttle (none are presently under consideration), or a refuelable manned launch system such as Third Millennium's Space Van or Pacific American's Phoenix. (For the record, Pacific American states that a recovery of such satellites from geosynchronous orbit using the Phoenix spacecraft would have an estimated mission cost of $2 - 3 million per satellite.)

NASA Proposes New Shuttle Prices

NASA has submitted a new Shuttle launch price for beyond 1988 of $87 million (all prices in 1982 dollars) for a full cargo bay. According to NASA, this price is based on a "full cost recovery" formula for 24 flights per year.

NASA pricing policy has already set a full cargo bay price from 1986-1988 of $71 million per flight. This is based on NASA's "out-of-pocket" costs (which generally refer to costs of expendables and consumables such as the External Tank, solid and liquid propellants, etc.) for about ten flights per year.

Will the post-1988 prices result in full cost recovery? NASA is not releasing the report containing its precise cost figures, but we can take a quick look at some numbers:

Estimates for the total cost of a Shuttle flight have varied from $250 to $350 million, depending on the source. The General Accounting Office (GAO) puts it at $275 million. We'll give NASA a break and use the $250 million figure that this newsletter has used in the past. Subtract the out-of-pocket costs of $71 million per flight and you get $179 million per flight attributable to general overhead. At ten flights per year, this puts the yearly overhead cost at about $1.8 billion.

Again giving NASA the benefit of the doubt, assume that they can accomplish 24 flights per year, and that their overhead costs will not appreciably increase with the number of flights. Then, the cost per flight attributable to overhead would be $1.8 billion / 24 = $75 million per flight. Tack on the $71 million worth of expendables and you get $146 million total cost per flight after 1988. This is considerably more than $87 million.

The above calculations may be missing something important. Maybe "full cost recovery" means something different in bureaucratese than it does in English. Maybe some minor item has been overlooked that can account for an extra $59 million per flight. If so, I'm more than willing to listen.

Knowing Which Side Your Bread Is Buttered On Dept.

A senator rather than a teacher may be the first civilian observer to get a ride on the Space Shuttle. Sen. Jake Garn (R.-Utah) has been invited to fly on the Shuttle sometime in 1985. President Reagan wanted a teacher to be the first such observer to ride the Shuttle as part of NASA's Space Flight Participant Program. The teacher would fly sometime in 1986.

Sen. Garn is chairman of a group which oversees NASA's annual budget: the Senate Appropriations subcommittee on housing and urban development and independent agencies. Garn has been pushing NASA for a Shuttle seat since 1981. It has been reported that he is not beyond using his influence to get one and has already been rattling NASA's cage threateningly about the high cost of the Space Station.

NASA, for its part, states that Garn's Shuttle ride will have "official" status. He will be on "an inspection visit in a management role as a mission participant." Theoretically, this would still make the teacher the first "citizen observer." NASA also pointed out that Garn, a former naval aviator, is very qualified, having over 10,000 flying hours, many in high-performance aircraft. It is not immediately clear how this makes Garn more qualified to put noseprints on the Shuttle windows, which will probably be the extent of his mission participation.

NASA has also offered Shuttle flights to any other subcommittee chairmen with a hold on NASA's pursestrings.

Until next time, Tom Brosz

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.

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