

\$pace: The Final Financial Frontier

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Introduction

Securing the initial financing for New Space Industries (NSIs) will not be easy. The traditional sources of funding—bank loans, venture capital, debt and equity markets, and government subsidies—will be accessible only to the most competitive businesses. Even then, when bankers, insurance companies, and private investors calculate the expected risk and return of outer-space business endeavors, including Moon and Mars exploration projects and proposed settlements, they will probably be less than sanguine about the early prospects. The exorbitant cost of launches—currently running as much as \$10,000 for each *pound* placed in orbit—and the need for a basic infrastructure to support life and industrialization in outer space are just two of the more salient near-term deterrents to outer-space commerce. Furthermore, in this stage of space exploration, only governments have the launch vehicles and only governments approve astronauts to fly in space.

Nonetheless, new markets encourage creative financing. Space development banks, commercial spaceports, favorable legislation and policies, and even lotteries have been proposed for bridging the early development stages of the various NSIs. The pace at which we move toward this new industrialization is not just dependent on technical know-how and advancements. How these new ventures are financed in the early stages of development will greatly influence not just the pace of commercialization, but the character of this industry's development as well.

Financiers will evaluate commercial space projects just as they do terrestrial ones—using traditional financial measures to estimate risk and return. The newer the industry and the venture, the more uncertainty and risk will be factored into the decision-making process. Furthermore, the more established and familiar business ventures will afford a higher degree of comfort to the financial industry.

Commercial Space Investments Are Already Profitable

Lest anyone doubt the profitability of businesses commercially operating in space today, they need look no further than the commercial satellite industry. This industry has a thirty-four-year track record of commercial space operations dating back to

April 1965 when the *Early Bird* satellite was successfully launched. Since then, commercial space ventures have grown and profited to an impressive degree.

The first time separate satellite industry revenues were reported was in 1978 when *The U.S. Industrial Outlook* published 1976 COMSAT operating revenues of almost \$154 million. COMSAT is the private communications satellite company organized and started by the U.S. Congress.

Twenty years after this first report of commercial space operating revenue, KPMG Peat Marwick and associates issued its *1997 Outlook: State of the Space Industry*. This report put global operating revenues for the satellite industry at \$62.2 billion for 1996 and forecasted global operating revenues for the industry to be \$106.6 billion in the year 2000. Using the KPMG analysis, revenues for the satellite industry increased more than 406 times in the twenty years since COMSAT's operating revenues were first reported in *The U.S. Industrial Outlook*.

In addition to the KPMG *Outlook* report, two other industry reports are useful in demonstrating the financial success of this industry, though they don't evaluate and analyze the industry in the exactly the same way. Merrill Lynch, in its *Global Satellite Marketplace 99*, projected the industry to increase from an estimated \$36 billion in 1998 to \$171 billion by the year 2008. This represents a 17.5 percent annual growth rate.¹

C.E. Unterberg, Towbin, a noted financial company with offices in New York and San Francisco, produces *The Satellite Book* with quarterly updates. According to the second quarter 1999 issue, the commercial satellite industry is estimated to grow from a \$54.8 billion industry in 1998 to an estimated \$116.3 billion in the year 2003.²

It is also worth noting that the financial success of the pioneering space companies—Hughes, Loral, COMSAT, PanAmSat, AsiaSat, Inmarsat, and Intelsat—has been similar to the success of the commercial space industry in general. These companies and others have changed over the years, and while their growth has not always been consistent it is obvious that commercial space operations have been highly profitable for these companies. Knowing that this profitability and growth can be earned from space business operations is an incentive for the New Space Industries.

General Barriers to Expanding Space Commercialization

There are several important barriers to expanding space commercialization. The obvious lack of both strong public- and private-sector financing in commercial space ventures is a problem. The recent failures of the Iridium and ICO satellite ventures and the difficulties faced by Globalstar continue to contribute to this issue.

The perception that space has to be expensive remains a problem, especially when seeking private-sector financing. Most in the private sector are convinced that space

is always going to be expensive. They believe this because it is that way for the current space program and NASA projects. This perception is incorrect but difficult to change since businesses look to the government and NASA for almost everything to do with space.

Regulatory issues complicate commercial space ventures and raise the cost for doing business. Problems can result from either the lack of regulation or excessive regulation, depending on the nature of the venture. Regulatory issues also add to the political risk of some commercial space investments and this too raises costs for the ventures.

Other general barriers to expanding space commercialization include the fact that markets for NSIs are unknown or uncertain at best. There is also the issue of who can qualify to go into space. Astronaut's medical requirements are currently the only standards used for people going to space, but they will probably not be applicable to a space traveling general population. However, there are potential medical issues facing would-be space travelers, some of which may prove to be a barrier for people wanting to go to space.

Types of Financing

There are several types of financing which may be available to NSIs. One type of available NSI financing is angel financing. Angel financing refers to a generous individual or organization offering investment funds because of an interest in the project rather than just a concern for profit. There are already examples of this in commercial space investing. Perhaps the best known example is that of Walt Anderson and MirCorp. Mr. Anderson is reported to have invested approximately \$21 million to help save the Russian space station Mir and to fund its new operating company, MirCorp. Another example includes noted author Tom Clancy, who made a sizeable investment in Rotary Rocket Company for developing the Rotan Reusable Launch Vehicle (RLV).

In addition to angel financing, NSIs can and do seek venture capital investment. Venture capital investing in NSIs has been a focus of my doctoral research over the past four years and I have devoted an entire section of this paper to that discussion. Venture capital represents a legitimate target for NSI business ventures but it also represents a market that will require special handling if the NSIs are to successfully attract capital.

Traditional sources of financing will also be available to NSIs. This includes the use of debt, equity, insurance funding, and bank lending to finance projects and company growth. Start-up NSIs will have more difficulty tapping into these sources of financing than existing companies or successful, well-known aerospace companies. Furthermore, NSI ventures will need to be further along in their development to

attract funding from these sources unless the ventures have assets with which to secure the financing or attract equity buyers to the company.

Other Financial Barriers for NSIs

What makes financing a commercial space venture difficult is the fact that a commercial space venture has to overcome the previously discussed general barriers to secure its financing that a terrestrial business venture does not usually have to be concerned with when raising capital. In addition to these financing difficulties, the performance record of other space businesses can sour investors to the prospects for NSIs. This is best shown by looking at Iridium, LLC, the low Earth orbit (LEO) telecommunications company. The company suffered a disastrous first year of operations and subsequently went into bankruptcy in 1999. Motorola, the principal owner of Iridium, now plans to drop Iridium's satellites out of their orbits so they will burn up in the atmosphere as this will eliminate ongoing operating losses. These problems have made the financial community nervous about financing commercial space ventures.

Iridium's problems prevented ICO Global Communications of London from obtaining its financing, which was to consist of a minimum of \$500 million from its existing shareholders and the financial markets.³ ICO would later require an additional \$1.7 billion to complete its global satellite communications system network. According to financial analysts, "the failure of ICO's rights' offering is a signal that investors, shaken by the commercial problems of ICO competitor Iridium LLC, are looking more skeptically at mobile satellite services. The basic questions these guys have to answer is: Where is the market? Until they convincingly answer that question, they will have a tough time raising capital."⁴

There are other obstacles as well, including those that affect the financing for the design and testing of RLVs. Peter B. Teets, president and chief operating officer for Lockheed Martin, when referring to its VentureStar RLV, told Congress on May 21, 1999, that the project was unsuccessful in attracting Wall Street investors and "would need some form of added government funding or loan backing." He added: "Wall Street has spoken. They have picked the status quo—they will finance systems with existing technology. They will not finance VentureStar."⁵

RLV financing has also been clouded by the fact that RLVs are primarily being designed for launching small payloads to LEO. Though this market may seem large, it is plagued with uncertainty, which makes it difficult for an RLV company to attract investment capital.⁶ The financial problems of ICO, Iridium, and other LEO satellite companies contribute to this uncertainty.

Statements made by NASA Administrator Daniel Goldin and other prominent space professionals such as Mr. Teets can adversely influence the financial community and create obstacles to financing. For example, on July 12, 1999, *Space News* quoted

Goldin as saying that U.S. companies and investors won't finance costly new launch-vehicle programs without further reducing the technical and financial risks. Goldin also was reported to have said that

NASA will probably have to retire the technical risk. There isn't one corporate executive in their right mind that would take on a multibillion dollar investment that won't have a payoff until 10 years from now. In the space community, we have space in our heart. When you're in corporate America, you've got to meet the numbers.⁷

Venture Capital Studies

In examining the potential for financing NSIs, I conducted three surveys of the venture capital industry in 1996, 1998, and 1999. The 1996 survey was addressed to eighty-one California venture capital firms and one venture capital company in Georgia, while the 1998 survey was sent to over six hundred national venture capital companies. They each received a response rate of 17 and 10 percent, respectively. The 1999 study went to 1,076 venture capital firms across the United States but received a response rate of 6 percent, making it the survey with the worst response rate.

The fact that the survey arrived during the 1999 holiday period and did not reach a portion of its intended market may explain to some degree the limited response. Furthermore, several surveys were returned without any answers to the questions, but with handwritten notes explaining why they either have no interest in commercial space investments or no interest in responding to the survey. There were nineteen such "responses" to the survey.

One reason given for the lack of response was that NASA lost two Mars missions during 1999. This was cited as proof that space was too expensive and too risky for commercial development and contributed to their lack of interest in commercial space projects and responding to the survey.

Another frequently cited reason for the venture capitalist's lack of interest in commercial space projects was the problems with the December 1999 Shuttle *Discovery* mission. The media coverage regarding *Discovery* clearly had a negative effect on commercial space financing from venture capital sources. Launch failures during 1998-99 were also cited as reasons to avoid commercial space investments.

In all three surveys the venture capitalists expressed concerns about commercializing outer space. Their concerns centered around the high cost of getting into space, high insurance expenses, long development times, restrictive government policies, high risks of funding with the requirement for equally high returns, market uncertainties, inexperienced space company management, and complex legal issues.

All those who completed the survey recognized that commercial opportunities are possible in outer space. The most likely commercial opportunities cited have remained constant over the years and include launch services, communications, microgravity projects, infrastructure, remote sensing, space tourism, and extraterrestrial resources. The most frequent follow-up comment was that because of the various risks associated with commercial space ventures, these opportunities may encounter problems in financing and implementation.

The venture capitalists also expressed a serious concern about the lack of management experience and depth for NSIs. Market size was an important concern, as was the probability of very high investment and capital costs. Internal rates of return higher than 50 percent were cited as mandatory, with payback periods ranging from three to six years followed by an exit strategy. Also mentioned was the degree of management control that would have to be abdicated in return for venture capital investment. Most felt these conditions would be too extreme for most companies to handle, thereby making venture capital somewhat unattractive as a source of financing to NSIs.

A serious concern expressed by the venture capital respondents was the issue of competition for the investment dollar with terrestrial investments. New space business ventures can successfully compete for these funds, providing the investment merit of the space project equals or surpasses the alternatives. This is a significant obstacle in NSI financing, especially in the early phase of this industry's development.

While the venture capitalists have expressed concerns about competing for available investment funds, it is worth examining the size of the venture capital market to determine if the market itself is a limiting factor for NSI investment. According to VentureOne of San Francisco, a primary resource company for the venture capital industry, 1998 produced venture capital investments at an "all-time high of \$12.5 billion, a 12.5% increase from the 1997 total of \$11.2 billion."⁸

Furthermore, there were 1,824 recorded venture capital transactions for 1998, up from 1,821 recorded transactions for 1997.⁹ The venture capital trend continued for 1999 as the first quarter represented the highest amount of venture capital raised in a single quarter at \$3.59 billion, a 31.8 percent increase over the first quarter of 1998 and a 10.5 percent increase over the fourth quarter for 1998.¹⁰ With the amount of capital flowing to venture capital markets, the problem facing the developing commercial space industry is not a shortage of funds; rather, it is the nature of the business itself.

Venture capital on its own is not the most important component of financing for commercializing space as we head into the next century. It does, however, represent a key foundational component for the industry. Because of this, venture capital can be an important initial as well as teaching tool along the way to a commercial space environment that will be "just another place to do business."

In addition to venture capital, NSI proponents would benefit from not only enhancing their attractiveness to the financial industry, but working toward constructive government tax and incentive programs as has been the case with the development of other industries. Bridge-financing assistance through the creation of both national and state space development banks and commercial spaceports would also be an important element in paving the way for commercially successful NSIs.

A New Law That Hinders the Commercialization of Space

Compounding the problems of financing commercial space projects are new laws and regulations involving export restrictions. On October 17, 1998, the 105th Congress passed The Strom Thurmond National Defense Authorization Act of Fiscal Year 1999, which created changes and new policies in commercial satellite export controls. In essence, this bill transferred the export control for commercial satellites and all their related activities from the Commerce Department to the State Department, effective March 15, 1999.

This bill has set a threatening tone for U.S. companies involved in the commercial space industry. There is also the risk that this bill may be only the beginning of legislative efforts to restrict U.S. companies from exporting their products, a development which can potentially damage American businesses in the international marketplace. The bill has already had a negative effect on satellite companies seeking insurance, which is essential for obtaining financing. A recent example involves DirectTV, Inc. of El Segundo, California. The company was forced to delay the August 1999 launch of its direct-broadcast television satellite because insurance was unavailable. As a result of these export controls, the U.S. State Department prevented the company from sharing technical information about the satellite with non-U.S. insurance underwriters. The underwriters refused to insure the satellite without the technical information.¹¹

Conclusion

Financiers pay attention to the bottom line—the payback period and the expected return. They will also consider political risk and market risk. The economic viability of such programs must be demonstrated before private-sector capital will flow into them. Research and development alone will not attract or justify private-sector funding as these ventures will be steeped in financial uncertainty. Aside from millionaire space enthusiasts who will support projects regardless of business merit, the great majority of investors will require rational, grounded, and proven financial results. This point should not be forgotten when planning new space development projects.

Developing NSIs can be as potentially lucrative as the satellite industry. Yet there are still significant obstacles to be addressed before NSIs can become reality. To succeed,

the management of NSIs must understand how they are going to be evaluated, how their business is going to be financed, and what the true market potential for their venture means in terms of generating revenues and ultimately profits. NSI management must present legitimate business plans, projections, and forecasts to demonstrate to financiers that their ventures can not only compete with terrestrial investments, but can ultimately be more profitable. There is much to be done before most NSI development can commence.

¹ Thomas W. Watts and William W. Pitkin, Jr., *Global Satellite Marketplace 99* (New York: Merrill Lynch, Pierce, Fenner & Smith, Inc., 1999), 15.

² J. Armand Mussey, William B. F. Kidd and Patrick Fuhrmann, *The Satellite Book*, vol. 1, no. 2 (New York: C.E. Unterberg, Towbin, 1999), 7.

³ Peter B. de Selding, "ICO Falls Short of Goal: Lackluster Stock Offering Leads to Extension," *Space News This Week*, an e-mail magazine, 14 June 1999, 1, available through subscription to *Space News*.

⁴ Ibid.

⁵ Frank Sietzen, Jr, "Wall Street Rejects VentureStar," *Spacedaily.com*, 21 May 1999, <http://www.spacedaily.com/spacecast/news.rlv-99g.html>.

⁶ Jeff Foust, "The State and Fate of Small RLVs: A Report on the Space Access '99 Conference," *SpaceViews*, an online magazine, Part 1, May 1999, 1, <http://www.spaceviews.com/1999/05/article2a.html>.

⁷ Brian Berger, "Goldin Pessimistic on Private Development," *Space News*, 12 July 1999, 1, 19.

⁸ VentureOne Corporation, "1998 Investment Highlights," <http://www.v1.com/research/venturedata/stats/q498news.htm> (21 July 1999).

⁹ Ibid.

¹⁰ Ibid, <http://www.v1.com/research/venturedata/stats/q199/news.htm>.

¹¹ Peter B. de Selding, "DirectTV Faces Launch Delays; Export Concerns Stall Insurance," *Space News Content*, an e-mail magazine, 19 July 1999, 1, available through subscription to *Space News*.

Other Resources:

KPMG Peat Marwick. *1997 Outlook: State of the Space Industry*. KPMG Peat Marwick, SpaceVest, Space Publications, and Center for Wireless Telecommunications, 1997.

U.S. Department of Commerce. *The U.S. Industrial Outlook*. Washington, DC:
Department of Commerce, 1962, 1978.