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## Paper Session II-B - Space Industry Overview: The Outlook For Space Finance

Frank A. DiBello

*President and Chief Executive, Florida Space Finance Corporation*

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# Space Industry Overview

## The Outlook For Space Finance

**Author:** Frank A. DiBello  
President and Chief Executive  
Florida Space Finance Corporation

**Telephone:** (321) 690 - 3397

**Fax:** (321) 690 - 3394

**E-Mail:** frank@floridaspacefinance.com

### Summary:

The growth and opportunity that the space industry presents in today's world is dramatic. Quietly and unassumingly over the last decade, the industry has begun to integrate itself into the mainstream fabric and economies of most nations throughout the world.

From contributing much of the infrastructure and backbone necessary for global communications, to providing new resources to help farmers increase their crop yields, to providing new efficiencies and capabilities to a whole host of industries through the commercial application of space technologies, space has become pervasive in our everyday lives. This paper provides a brief history of the industry; its direction and significant trends are reviewed in the context of near and future market opportunities for investors.

Also, in the last few years, new space businesses have watched the emergence of a recognition and gradual acceptance by traditional financial markets of the attractiveness of investment opportunities in space ventures. Capital markets are cautious, but appear to be adopting new structures to meet the challenges for financing the infrastructure required for the next decade of space businesses. The present state of the space finance community, as well as new approaches to meeting the challenges of the next decade in financing new space ventures are also addressed.

## I. A Brief History

### The Past

The 1970's and 1980's represented a period in which we celebrated that transcendent moment in time when everything became possible. Mankind had escaped the bounds of our planet and set foot on the moon. In spite of the euphoria over man's accomplishment on July 20, 1969, during the next 30 years, the dream of a rapidly emerging commercial space industry did not take off with the same success.

The next two decades, the 1970's and 1980's, were marked by a period in which Government was the driver for most space activities, which included both military and civil programs and strongly influenced the evolution of any beginning commercial activity. Government set the requirements and provided the markets. Technologies were being pushed to meet fundamental national missions, such as intelligence gathering, remote sensing, communications, space exploration and defense, etc. Commercial applications of space technology were basic, but included early satellite communications, some remote sensing and a few exploratory niche markets. Private sector investments were few and difficult, and were widely perceived as carrying high risk. Entrepreneurial ventures struggled.

The space industry was in its *infancy*. In spite of the wonder and awe of the many mission successes and accomplishments of national space programs, commercial initiatives failed to catch the enthusiasm of either the public or the investment community. Entrepreneurs of the era assembled their business plans and brought them to Wall Street, but they often spoke of the technology and their plans in a language far different than the language of the investment community.

They emphasized the *technology* and spoke in terms of "*potential*" for *space business* that surrounded the application of the technology. Therefore, these plans were simply perceived as being too far from revenue and too risky for serious investment consideration.

### The Transition.

By the end of the decade of the 1980's, fundamental change was evident in the industry. *The space industry was no longer in its infancy, but had moved into young adulthood.* The investment community had begun to become comfortable with the Geostationary Satellite business model, and the early 1990's saw financing of GSO telecommunications ventures become more routine.

A period of emerging growth and signs of prosperity began to mark the space industry. Some sectors began to see compound average annual growth rates of 30% or more, especially in select telecommunications services and new emerging applications involving GIS, GPS and other data services. Space infrastructure also saw steady growth at averages of six to ten percent.

More significantly, however, in 1996, the space industry achieved another major milestone, when for the first time, total space industry revenues coming from commercial sources, exceeded those coming from government. Industry performance data showed commercial space industry revenues as being 53% of a total worldwide revenue level of approximately \$66 Billion. VSAT and fixed earth station sales topped \$1 Billion annually, and more satellites were launched from 1990 to 1996, than were launched in the previous three decades. Significantly, many of those launches were paid for by commercial telecom companies who were serving fixed satellite telephony and direct broadcast markets. By 1999, .....*the space industry was coming of age, and in the decade of the 2000's, should have been poised and realizing significant growth and mass-market services,.....but the environment changed!*

## II. The Market Environment Today

In order to understand the space market environment today, it is important to look at the key drivers of space industry growth in the last decade.

First, there was the continued defense-related R&D push in the technology base that manifested itself in such areas as the integrated battlefield, net-centric warfare, space-based defense and

communications, precision weapons, and advanced air and space platforms. These, coupled with continued influences of globalization and defense conversion that marked the lessening of cold war tensions, as well as the introduction of new homeland defense requirements are continuing to revolutionize the base of technology that drives the present and future of our aerospace workforce.

Aerospace industries themselves, are modernizing around these new technologies, and are becoming better equipped to apply new methods and capabilities toward future commercial market requirements and needs. Further, world economies, supported by this industry, are also experiencing the rapid emergence of an information society, with the attendant continuing growth in bandwidth demand and new applications. This, in turn, is fueling significant investment in vast new infrastructure to meet the demand for bandwidth and related services.

This demand was temporarily impacted by the very visible downturn in the overall Telecom marketplace at the end of the year 2000, which was coupled with the crash of much of the over-inflated portion of the internet/dot.com industry.

The future commercial space marketplace will likely take advantage of the natural convergence of computational power, communications and new product/services, which are aimed at improving productivity and quality of our businesses and everyday living. This coupled with the impact of the “age of the internet”, readily available Internet access, and new applications by satellite will be the major drivers in the growth of new space-related businesses, as the merits of using satellites are discovered in new applications. This is especially true in developing countries or in areas of the world where terrestrial infrastructure is not dense. Satellites are still one the most effective and efficient ways of reaching vast areas of the worlds population to enable the movement of data, information and related services, because of the inherent mobility, bandwidth, speed and ubiquity of coverage that satellites provide.

In spite of a very real fall-off in demand for telecommunications infrastructure and following the market downturn of 2000, demand for most satellite-related manufacturing and launch business remained relatively flat on a worldwide basis from 2000 to 2002. Industry research from such sources as the Yankee Group, Pioneer, Teal, Euroconsult, SpaceVest, Futron, and others, reflects a 2003 forecast of worldwide space industry revenues that will exceed \$100 Billion across all sectors. Infrastructure, which has been experiencing a CAGR of approximately 8% will reach \$42 Billion, and Telecommunications Services, which is the principal economic sector that is employing space infrastructure in commercial business is estimated to be \$46 Billion at year end.

Emerging Applications, which comprises new applications of remote sensing, geographical information systems, applications of GPS, tele-medicine, and other measurement and sensor-based data applications remains the fastest growing sector with a CAGR of approximately 16%, and will approximate nearly \$8 Billion this year.

Finally, a fourth sector, Support Services is expected to reach just under \$4 Billion. The space industry as a whole is expected to reach over \$125 Billion by the year 2005.

Driven by renewed and continued growth in telecommunications and bandwidth demand, satellite replacement needs and requirements for new broadcast and broadband services, the space industry will soon emerge from this period of slowdown that began in the year 2000, and in the near future, perhaps as early as 2005, will be looking at large diversified markets in such areas as healthcare, advanced learning, quality of life and entertainment/tourism, to name only a few, which will be served by many new high growth companies.

Many of the service leaders of tomorrow do not even exist today, just as such companies as Microsoft, Apple, Direct TV, EchoStar, Sirius Satellite Radio, America On-Line and others didn't exist 25-30 years ago. New growth companies will introduce vast numbers of advanced enabling products and services into new emerging industries. The research, development and technologies that have been, and continue to be, spawned by national defense and space agencies around the world, are maturing and finding their way into commercial applications for today's mass market needs.

Also today, the world economic engine is being driven more and more by the movement of data, information and related services, much the way that airports, roads and railroads opened up the economies of the last century. The space industry will play a vital role in this future market development.

From a macro view, the space industry is likely to add between \$200-\$300 Billion of new infrastructure which will generate forecasted aggregate revenues of over one Trillion dollars over the next five years, with some new growth sectors exceeding 60% annual growth. These growth rates are frequently found in some of the new terrestrial applications of space-related technologies to mainstream commercial markets.

#### New Applications Areas.

Some of the key new applications areas that the space technologies are being applied to, and which will represent solid opportunities for investors are listed below:

DBS / DTH / DARS / Broadcast	Private Networks / VSATS	Micro Satellite Systems
Real-Time Weather	Health / Bio-Informatics	GPS / GIS / Remote Sensing
Machine Cognition / Robotics	COTS / Heuristic IT Solutions	MEMS / Micro-Machine Devices
Internet Solutions	Advanced Productivity Tools	Sensors / Measurement Devices
Handheld Data / Video Devices	Advanced Materials	Transaction / Process Control
Multimedia Applications	Mobile-Asset Tracking Systems	Entertainment / Space Tourism

#### Future Space Markets Outlook.

It is clear that Space and Satellite markets in the next decade will be characterized by:

- 1) Asset decisions that are commercially driven for productivity,
- 2) Mainstream mass markets for consumers, in the areas of health, learning, quality of life, safety, and entertainment, and,
- 3) Increasing industrial and business dependence on value-added information, for multi-layered corporate executive information systems (EIS), to drive corporate decisions and to optimize strategic positions and supply / distribution chains.

Finally, after many false starts and failed promises for commercial space industry growth, the next decade from 2005, promises to be a decade of real growth for the commercial space industry, and should see the creation of a host of new infrastructure and services companies that represent the new business environment for the new millennium.

### **III. Outlook for Space Finance**

#### A Brief History.

During the period when the space industry was driven primarily by government presence, space finance depended on the mechanisms typical of an industry in its infancy, i.e. subsidies, government guarantees, and anchor tenancies. Since government both set the requirements and was the principal customer, private institutional investment was hard to come by. In order for a space project to attract any private sector interest, there had to exist sufficient preconditions with the government such that most market, schedule and completion risks were guaranteed by the government, and further, could not be canceled. Further, there had to exist a sufficiently large and addressable secondary commercial market to really catch investor interest

This environment continued until the era when the barriers to space finance were reduced, and the use of geostationary satellites for commercial communications became more widely accepted. The institutional finance community began to recognize the GEO satellite business model as commercially viable.

Prior to this era, the space industry carried a mystique of complex programs, high risk, burdensome involvement of government bureaucracy, and a mis-matching between the technological reach of the product offering and actual commercial requirements. But perhaps, the single biggest barrier to financing early space businesses was the general absence of true commercial skills in the people involved, i.e. the management team presenting the business plan or moving the technology to market.

#### Perceived Risks.

In the late 1980's and early 1990's, many of the traditional barriers to space finance from this earlier *infancy* era were lessened and capital from the traditional financial markets gradually became more readily available. Still, however, the financing challenges had much to do with the finance community's perception of the material risks involved. Typical risks, which inherent in the space business cases presented to investors, were:

- 1) time to market, i.e. the beginning of a revenue stream and substantive cash flows,
- 2) technology involved, and whether it was really ready for infusion into an operational model or introduced an unwarranted complexity into the business,
- 3) competitive landscape, including not just other competitor companies, but also competing technologies and changes in the anticipated pricing of a proposed product/service offering at the time the new and competitive service will both be in the market, 4) the capital plan and related financing strategy, and particularly whether or not the company could raise what it needed under the anticipated market conditions, but also whether the business can carry the cost of the equity/debt that must be raised assuming some slips in schedule, and
- 5) the impact of the regulatory and license environment that the business must face.

#### Financing Impact Factors.

Several major impact factors have been introduced into the space finance landscape in the recent period from 2000 to today.

Key among these has been the driving force of the Internet on space business. While Internet is driving satellite applications, and that is generally considered a good outcome, Internet had also been setting extraordinary expectations for returns and market performance in the finance community, and satellite deals were being evaluated against these Internet alternatives for capital deployment and gain.

There is also, however, a downside to the relationship between satellites and the Internet. Amid the turmoil of crashing dot-coms and distressed network operators, many telecommunications operators experienced their worst market and economic crisis in many decades. While this affected most and suppliers of telecommunications infrastructure and equipment, and some wireless service providers, satellite operators were among the few segments with some good news to bring to the market.

The years 2000, 2001, and 2002 all saw double-digit revenue growth (approximately 15%), with backlog and profit margins remaining high. While revenues for some satellite operators did grow during this period, the satellite manufacturing and launch marketplace held relatively flat.

In 2002, the worldwide launch market was 65 launches, of which 24 were commercial. This followed a 2001-year, which saw 59 total launches worldwide, 16 of them commercial. The year 2002 saw commercial GEO satellite orders at 12 worldwide, with some of these representing re-sales or prior year placements. This was a falloff from a total of 28 the year before. Forecasts for 2003 however look strong as operators seek to replace aging infrastructure and increase the number of transponders on orbit.

While there is significant global competition for satellite business, US manufacturers have obtained the major share of this world market for new satellite construction, but this competition further affects the reception and scrutiny that a satellite company faces in the financial markets today.

The changes in U.S. technology controls (ITAR) and export restrictions have had a dramatic and negative impact on the satellite and launch industries, especially for U.S. companies. The delays in gaining approvals for Technical Assistance Agreements and proposal response, i.e. exchange of

information with potential customers, has put U.S. companies and often their international partners in serious jeopardy.

Fundamentally, many consider U.S. policy in this area to be very shortsighted, and believe that, “the horse has already left the barn”. Satellite and launch service buyers in any country can get what they need from many sources worldwide, and if U.S. companies cannot respond to their needs, other global competitors will. This policy area continues to have a very serious impact on the enthusiasm level of the space finance marketplace.

Another serious impact factor has been the publicly acknowledged failures and pending financial restructuring of Iridium, ICO, Globalstar, Orbcom and others. The failure of each business case to support the timing and levels of debt included in their business/financing strategies will resonate in the finance community for some time. At best, the industry will be far more cautious in looking at the business case for satellite companies going forward.

Finally, there is a real increase in the “satellite savvy” of the institutional investors who are reviewing satellite businesses for finance. Only a few years ago, there were, at best, a precious few satellite industry analysts who were reviewing satellite business deals for finance in institutional finance organizations worldwide. Today there are several dozen capable investment analysts and support firms, advising on key financing decisions. When added to the other industry impact factors that have raised caution levels within the industry, we can expect to see the flow of new finance for satellite deals to those that have returned to the foundation of a “rational business case”.

### Future Outlook

Following the collapse of dot.com and telecommunications markets in 2000, private equity fundraising began a steady decline that continues today. During the year 2000, venture capital firms raised over \$106 billion, while total private equity including mezzanine and buyout firms totaled over \$194 billion.

In spite of this unprecedented run-up of capital raised, venture investing across all markets, and especially in telecommunications, technology and space declined sharply in the next two years. For the full year 2002, venture investing totaled \$21.2 billion approximately half of 2001’s \$41.3 billion.

Debt markets are similarly difficult as many infrastructure bondholders were burned with the notable failures of some LEO and other telecom ventures, like WorldCom, Global Crossing and others. In short, equity and debt investors have pulled in their horns and are exercising greater scrutiny over any space or technology investment that they review.

Many analysts believe that the drop-off in investing and health of capital markets is near bottom, and will rise as markets begin to build in the next five years, especially in response to an expected rebound in demand for new satellite and telecommunications infrastructure forecast in the next few years.

The future in general is expected to be healthy for the financing of space businesses, but there are clear insights into some of the conditions necessary for achieving financing.

First and foremost, there must be a rational business case, built with a bottoms-up forecast of markets to be reached, not a top down view. This is especially true for space and broader technology markets.

Second, the existence of a few real customers will work much better in supporting the business case than promised ones. The days of “build it and they will come” are over for most space-related business plans.

Entrepreneurs that recognize, that the purpose of a business plan is to convincingly show how money will be made, not how finance will be raised, are the ones that will receive positive responses from investors.

Space finance is about financing businesses, not satellite or technology projects. Space and satellite businesses that present rational business cases will find finance markets receptive in the years ahead!