

FINANCIAL ISSUES FOR COMMERCIAL SPACE VENTURES – PAYING FOR THE DREAMS

by

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ABSTRACT

Based on considerable work for private sector commercial communications satellite, launch vehicles, payload processing and other new space ventures as well as work for NASA on Space Station User Development, Mr. John Egan of Coopers & Lybrand's Business Planning Group will discuss the various financial issues involved in commercial space enterprises. Because Coopers & Lybrand is one of the largest public accounting and management consulting firms in the world a particular area of interest is the financial and investment issues associated with new business areas. As a result, much of the Firm's work in the space business area has concentrated on this area. Specific issues to be addressed in this presentation include: (1) the various stages of market development for different kinds of space ventures; (2) issues involved in attracting investment capital to space ventures; (3) characteristics of the players (entrepreneurs, large corporations, aerospace companies, venture capitalists, investment banks, commercial banks and the Government); (4) what is needed to make individual space ventures attractive to investors; and, (5) what can be seen as the prognosis for future financing over the long term development of a commercial presence in space. Particular emphasis will be placed on the materials processing area discussing the current state of business plan and financial developments, what is needed for enhanced probability of success of future materials development efforts in attracting financial backing, and, finally, a detailed discussion of the risks involved in this entire business area.

DISCUSSION

Good morning Ladies and Gentlemen. I appreciate the opportunity to speak with you today concerning the financial issues of the commercial development of space – what I call “Paying for the Dream.” We at Coopers & Lybrand have been working with both NASA and private sector corporations for some years now looking at the financial marketing and business planning aspects of commercial space ventures. We started out on the commercial side of the ledger doing work in direct broadcast satellite, expendable launch vehicles, communications satellites, and various other satellite related services. Subsequently, we have had contracts with NASA to develop commercial users for the space station, a comparison of marketing techniques between the Shuttle, Delta and Ariane and work for Bud Evan's Commercialization Task Force. What I hope to do today is to assist you in understanding how the commercial financial community views space related ventures.

There are five major issues facing us in looking at the commercialization of space and paying for that commercialization effort. The first is resources. Resources encompasses both financial resources that one has at present and the ability to attract additional money. Of course the financial strength of the organization is important, but the organization's commitment to

the space project is also important. A corporation with significant corporate resources that is not committed to such a program will not have as much weight as a corporation with less resources that is viewed in the financial community as having significant commitment to the particular project. A resource, in addition to the available resources within the corporation, is the corporation's ability to attract money. This ability is a function of both the project itself, the quality of the management, and the general financial perspective of the corporation as a whole.

The second major issue is risk. In looking at space ventures, there are two types of risks which must be considered. The first is what we will call normal business risk. This is the risk associated with any on-going business or venture. It involves such items as:

- Will there be a market for my product?
- Will the public accept the product at the price established?
- Can the corporation make a profit based on the price and other market conditions?

Such normal business risks are very well known to those entering into any type of venture and space-based or space related ventures are no different. However, space-based ventures introduce what I shall call extraordinary risks. These extraordinary risks are those risks associated with the difficulties rising from the inherently risky nature of operating in space at this time. The first and perhaps the most important is the transportation issue. It is much more difficult to go to space, process in space and return a product from space than it is to say for example, take your product from the warehouse in Dallas to the distribution center in St. Louis. In the latter case, there are multiple means available and though there may be accidents and problems, the general operation is considered to be routine. Such is not the case with space-based processing. Though the Shuttle is becoming more common in its use and flights are becoming more frequent, clearly there are inherent risks involved in such means of transportation. As has been demonstrated within the last week with the unfortunate failures of both the communications satellite launch due to PAM failure, the ability to provide secure transportation to the space environment is in question. Until these transportation and operating risks can be reduced and made more routine, an additional risk factor will always be associated with space-based production.

Additionally, in some areas of future space endeavor there are additional risks. Principally, these rest in the materials processing area. At this time it is not known whether certain processes can be effectively done in space in the materials processing area. While in theory these processes work and certainly some experiments have demonstrated that they will probably work in practice, we do not know what efforts must be taken to take these processes from the scientific phase through to the production phase. There is considerable risk inherent in the venture in developing products from experimentation to maturity.

The third issue is credit worthiness. Credit worthiness is basically how the corporation is viewed by investors. An unfortunate outcome of the high interest period some years ago was the development of the term called creative financing. Creative financing is one of the great euphemisms that has plagued the financial community. Some people feel that it means obtaining money with little effort, or perhaps more importantly, with no collateral or ability to repay. It is still true that there is no such thing as a free lunch. There is also nothing new under the sun when it comes to financing. Those who lend money and those who take equity positions

in corporations and give money to entrepreneurs and new ventures at start up are, ultimately, looking for a payback. This means that either the loan will be paid at some interest or that the business will be profitable to the degree that the investors will reap a considerable profit. As such, there is basically no free lunch.

The next issue is one of potential. This is a measure of how the new enterprise is viewed by the investing community. It is a combination of both potential for market development over time and the strength of the existing management of that corporation or project.

Finally, there are market conditions. This category breaks into two distinct sections. The first is the general economic conditions which will affect the development of any new enterprise. Whether or not the country is in a growth phase and the general economy will support the expansion of industry is very important to new ventures. The second is the market condition in the specific market for which the new product is being developed. In many space-based projects, the timing of entry into the market is very important. Since space-based projects require a certain period of time to come on line, there is a degree of uncertainty as to whether markets will exist or technological developments in related areas that are not space-based will develop in competition with space-based projects prior to their introduction.

Now that we have looked at the various issues that confront a corporation considering investment in space, let us turn now to the sources of funds that would be available for their use. The first and most important is internal or corporate resources. This represents the amount of corporate funding that the parent corporation is prepared to put into the space-based project. Other sources of funding are available but the amount of internal or corporate resources that is committed to such a project indicates better than any other measure the level of commitment and degree of support that has been generated within the corporation in support of the space related project. The level of corporate resources can be leveraged with other types of funding to expand the available capital base to do work in space. However, if sufficient internal or corporate resources are not available, it is very, very difficult to leverage any outside funding for a project that is not supported or is not viewed to be supported by the corporation with its own resources. In other words, it is very difficult to pay for such a venture with what would be considered other people's money.

If general resources are inadequate to make the space-based project viable by themselves, consideration may be given to selling ownership in the corporation in order to obtain funding to go ahead. This funding is generally called equity. It comes in several different varieties and we will discuss some of them here. First is a private stock sale. A private stock sale is a sale of ownership in the corporation on a private basis. That is, it is not publicly traded and not made available to all potential buyers but rather a select group of buyers chosen by those holding the ownership. Such private stock sales are not regulated in the same manner as public stock sales by the Securities and Exchange Commission (SEC). Private stock sales are a common way of raising equity for more risky projects in which stockholders expect a long term return but do not expect major dividends or other types of payment in the interim. For many emerging space-based businesses private stock sales have been the source of a fair amount of funding.

Public stock sales are the sale of common stock in a corporation in a public market place such as the New York Stock Exchange. Such sales are regulated closely by the SEC and historically have been a function of the public's perception of how well a corporation with a track and in history will mature, develop and grow over time. Given the long lead time of space-based projects it is unlikely that a new venture would be able to enter into a public stock sale

successfully. The public generally expects to see a return on its investment in a relatively short time, certainly within the first two or three years after purchase of the stock. With the long time frame involved in the space-based work such a payback period is unlikely. For companies involved in the more mature portions of the space industry, public stock sales are valuable means of obtaining additional equity. In addition, being involved in space-based ventures has considerable public relations value and it may be of benefit to a corporation in selling its equity to be sure that those in the public buying market are aware of their advanced technology in the space business.

There are several types of partnerships that could be looked at in terms of obtaining equity. Limited partnerships and limited R&D partnerships are the principal two. Partnerships differ from corporations in that the losses in a partnership flow directly to the personal incomes of the partners unlike a corporation which is a separate legal entity. The reasons people join limited partnerships or R&D limited partnerships are to accrue tax benefits and thereby shelter additional income derived from other sources. The purpose of this is to get into a venture when it is incurring losses or has high depreciation or other tax benefits such as investment tax credits or research and development tax credits and utilize them for their tax shelter benefits. The most important thing in such a partnership is to insure that the partner's tax benefits are maintained within the partnership structure.

Additionally, equity can be raised through joint ventures. A joint venture is when any two or more corporations agree to work together on a particular project. The exact structure of a joint venture may vary from an individual new corporation set by the two parent corporations to simply a working agreement or contract between them to complete the work.

The second major source of outside financing is debt. There are a number of ways of raising debt to assist in the financing of space-based ventures. Debt is almost always a part of such a venture given that the amounts of cash required are quite large. The three most common ways of raising debt are preferred stock in which a preferred stockholder receives some type of guaranteed or preferential return on the investment that is usually based on an interest rate the preferred stockholder is paid on an annual basis. This is very similar to any type of a loan agreement and therefore classified as debt rather than ownerships. Some preferred stock is convertible into common stock which has ownership value. Bonds are similar to preferred stock and sold on the market as debt instruments to the general public. As with the sale of public stock the ability to sell a bond is greatly dependent upon the cash flow and revenue of the company selling the bonds. As with most new ventures, it is very difficult for a space-based venture to sell bonds.

The final way to raise debt is through conventional bank loans. In order to obtain a loan a creditor must show adequate resources to pay back the loan with the interest applied by the banker. For ventures which have some degree of risk, as most space ventures do, the interest rates charged by banks for a loan may be higher than that given for other types of loans. The conventional debt portion of any space-based venture may become substantial given the amount of funds required for most space-based projects.

The amount of debt which a project can raise is very much a function of the amount of capital that has been invested in the project and the class or quality of the corporation or individuals who stand behind the venture. To some degree the venture is transparent to its financial backers. The bank will wish to be assured, through some kind of contractual arrangements in establishing the debt requirements and making the loan available, that they will be receiving their

payments as required. This may mean that the investors, either corporations or individuals, will have to back or guarantee the loan to be used for a space-based project.

Finally, there is venture capital. Venture capital is a type of equity arrangement in which a venture capital firm takes a position in a corporation by making a large equity contribution for which they receive a substantial amount of stock and become major advisers to the corporation. Venture capital deals are very difficult to establish on space-based projects. There are two basic reasons for this; first is the long payback period and second is the large amount of capital required. Most venture capital deals require payback to the venture capital firm within three years. Most space-based projects have much longer time frames than three years. Secondly, and perhaps most importantly, a \$1 or \$2 million venture capital deal is a very large venture capital placement. Most space ventures require significantly more capital than this to get started. As a result, they are not of great interest to venture capitalists.

Now that we have reviewed the various potential funding methods, I would like to turn now to what is called the product life cycle curve. This curve, which is presented with the slides from this presentation at the end of this paper, is a way of looking at the business cycle for any product. It is not unique to space-based ventures but applies to any and all types of projects. Basically, there are five phases – the pre-commercial phase in which money is expended and no income is received because the product development is underway. A point at which the product is introduced is called the introduction phase, at which time sales begin to pick up and some profit or some return is received. During the introduction phase there are heavy costs for advertising and other introductory expenses. We then move to the growth phase in which the product's growth continues to rise and rises rapidly; it is during this phase that the product hopefully begins to return a profit or certainly return significant revenue. During the maturity phase the product reaches its maturity and becomes a well established product. Products maximize revenue during this period. The final period is the period of decline in which the sales volume and profits drop off. It is usually during the maturity phase and in order to avert the decline phase that new and improved versions of the product are introduced in the hopes of continuing the product along a generally upwardly sloping curve.

We introduced the product life cycle as the way of looking at the various places in which the space businesses are at this point in time. Communications satellites, for example, are clearly in the growth phase of the product life cycle. They are an established business with customers. They are making a profit and they are a growing business. As a result, they have the same type of characteristics as any product in this particular phase. Earth observation, on the other hand, is in the introductory stage and is trying to move into a growth stage. Finally, such products as materials processing or the building of space structures are in the pre-commercial stage in which money is being spent to develop them as products but no income can be seen at this time and income may be some time in coming. For MPS, it may be some time before products are even introduced. However, with the McDonnell Douglas electrophoresis program, introduction for their pharmaceutical products may be in the near future.

We make this analogy to point out that when each of the businesses is a different phase then different types of financing are appropriate. For a maturing business, that is a business on the growth cycle, such as communications satellites, the funding mechanisms would include internal resources, conventional debt and equity participation. For a product near introduction or newly introduced, internal resources would be necessary along with venture capital as a possibility, and conventional or other types of equity participation. For a new technology at the

start of a development, internal resources and equity participation are the principal available means of funding such projects. R&D partnership money may also be available for those types of industries.

Turning now to the investment obstacles that face any investor looking at space related venture, the first, and perhaps the most important, is the time obstacle. The payback time for most new space-based ventures, particularly in materials processing or other long term investments is significant. Some funding sources are, therefore, not available to such start-ups. For investments that are related to communications satellites, the launching of satellites or satellite related technologies the payback time may be significantly less and this may not be as great a roadblock as it is for those newer technologies. The second obstacle is very large capital equipment costs involved in virtually all space related investments. Such large capital equipment costs close out smaller businesses and smaller investors to some degree. A \$1 or \$2 million investment for any type of venture firm or equity investor or, for that matter, lender, is a significant amount of money. Many, many space ventures require significantly more money than \$1 or \$2 million. A part of the problem is a perception one for those that have been involved in space ventures for some period of time. We tend to speak in terms of multi-millions of dollars as if that were nothing. This is not in fact the case, and those who are going out and need to raise money must be aware that it is extremely difficult to get people to invest significant amounts in high risk ventures. It requires more than a strong personal commitment to the future of space.

The funding options available, as has been discussed throughout this paper, are restricted because of the two issues we just discussed. There is a reduced availability of venture or other types of speculation capital because of the reasons we have stated. Though large sums and long paybacks make such ventures difficult to finance, the upside potential of space ventures can go a long way, as we have discussed earlier, in off-setting these downside risks. However, the person seeking funding must be aware that this upside potential will not be able to off-set some or all of the hesitancy of either the equity investors or lenders. As a result, strong advocates and a strong business plan are essential in the development of any funding scheme.

Finally, there are three smaller obstacles. First is a management obstacle in that for many corporations short term paybacks are more important than the longer term paybacks. Since most space ventures are long term payback the manager whose future is career success based on some elevation using some type of short term measure, such as return on investment or return on equity, may be less interested in a space venture with a large equity and long payback requirements. The investor is also faced with a perception of technical risk – the risk involved with the transportation and manufacturing processes as opposed to the normal business risks of market – the desirability for the product or other market forces. To the degree that Shuttle transportation, space station operations and other types of space related manufacturing techniques become less novel and more routine that will benefit the space investor. Finally the nature of the business is quite entrepreneurial and not without risk. As such, the nature of the business requires that the investor be in the leading edge of their industries and be early adaptors or persons interested in accepting the risk for future reward. The future rewards of space-based technology are not guaranteed. As a result, those willing to take the chances should reap great rewards when rewards are forthcoming, but should be aware that the initial losses may be significant and the road is not an easy one.

C&L WORK IN SPACE-RELATED INDUSTRY

NASA

- COMMERCIAL USER DEVELOPMENT FOR SPACE STATION STUDY BEGUN APRIL 1983
- COMPARISON BETWEEN STS, DELTA AND ARIANE STUDY COMPLETED JULY 1982
- SPACE COMMERCIALIZATION STUDY (PENDING)

PRIVATE SECTOR

- COMMERCIAL EXPENDABLE LAUNCH VEHICLES – MARKETING AND FINANCING ISSUES
- DIRECT BROADCAST SATELLITES – BUSINESS PLANS AND FINANCIAL FEASIBILITY STUDIES
- COMMUNICATIONS SATELLITE MANUFACTURERS – MARKETING AND FINANCIAL ISSUES
- SATELLITE SERVICE PROVIDERS – FINANCIAL AND BUSINESS PLANNING

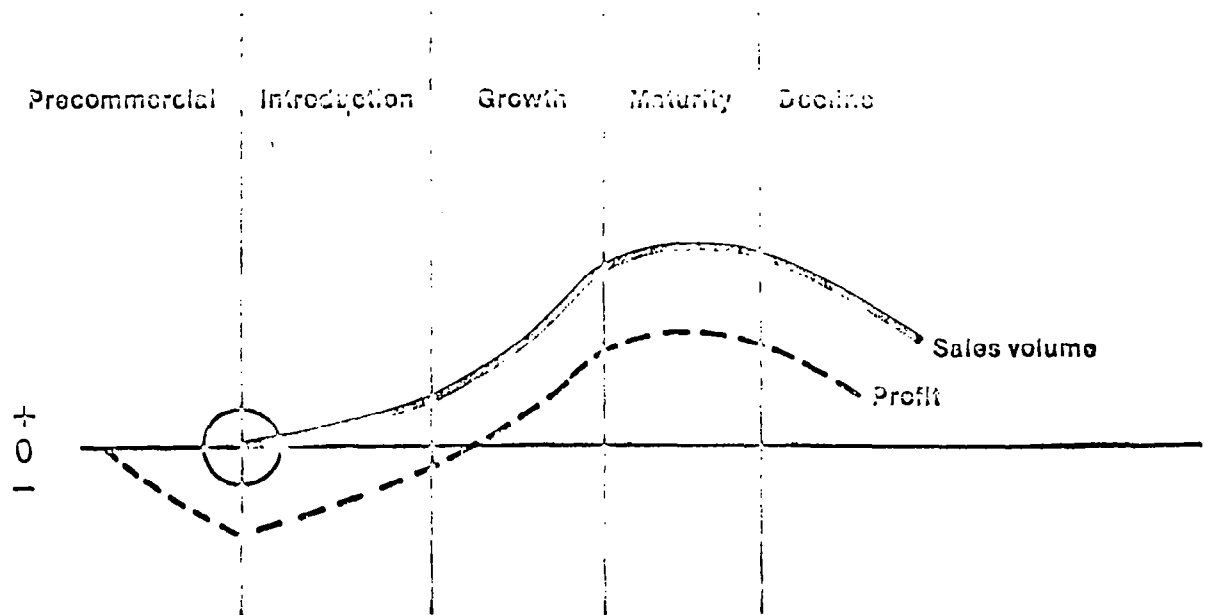
MAJOR ISSUES

- RESOURCES
- RISK
- CREDIT WORTHINESS
- POTENTIAL
- MARKET CONDITIONS

SOURCES OF FUNDING

- INTERNAL (CORPORATE RESOURCES)
- EQUITY
 - PRIVATE STOCK SALE
 - PUBLIC STOCK SALE
 - PARTNERSHIP
 - JOINT VENTURES
- DEBT
 - PREFERRED STOCK
 - BONDS
 - CONVENTIONAL BANK LOANS
- VENTURE CAPITAL
- R&D PARTNERSHIPS

PRODUCT LIFE CYCLE



WHERE IS THE BUSINESS?

- MATURING INDUSTRY
 - COMMUNICATIONS SATELLITES
 - EXPENDABLE LAUNCH VEHICLES
 - SATELLITE PROCESSING
- DEVELOPING INDUSTRY
 - EARTH OBSERVATION
- NEW TECHNOLOGY
 - MATERIALS PROCESSING

APPROACHES TO CAPITAL MARKETS

DIFFER DEPENDING ON STAGE OF MATURITY OF THE PRODUCT:

- MATURING BUSINESS
 - INTERNAL RESOURCES
 - CONVENTIONAL DEBT
 - EQUITY PARTICIPATION
- PRODUCT NEAR INTRODUCTION OR NEWLY INTRODUCED
 - INTERNAL RESOURCES
 - VENTURE CAPITAL
 - CONVENTIONAL DEBT
 - EQUITY PARTICIPATION
- NEW TECHNOLOGY AT START OF DEVELOPMENT
 - INTERNAL RESOURCES
 - EQUITY PARTICIPATION
 - R&D PARTNERSHIP

INVESTMENT OBSTACLES

- TIME – LONG PAYBACK
- LARGE CAPITAL EQUIPMENT COST CLOSES OUT SMALLER BUSINESSES.
- REDUCED FUNDING OPTIONS – REDUCED VENTURE/SPECULATION CAPITAL INVOLVEMENT.
- LONG TERM VERSUS SHORT TERM.
- INVESTOR PERCEPTION OF TECHNICAL RISK – RISK INVOLVED IN TRANSPORTATION AND MANUFACTURING AS OPPOSED TO BUSINESS RISK.
- NATURE OF THE BUSINESS