SPACE TOURISM AFTER DENNIS TITO

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Abstract

The May 2001 journey to the International Space Station (ISS) with passenger, Dennis Tito, brought sudden reality to space tourism. Tito showed the world, and especially NASA, that a civilian-trained astronaut could easily assume the rigors of space travel. Additionally, his trip confirmed the findings of several space-tourism market-research studies. These studies indicated that a valid space-tourist market indeed exists, even if it is at the lofty price of $20 million per person. Just as important, Tito's adventure struck a deathblow to the "giggle factor," which has plagued the space-tourism industry since its inception. However, neither the success of the Tito trip nor the market research indicating probable profitability for space tourism is sufficient on its own or together to propel the industry into daily reality. While Tito demonstrated the viability of commercial space travel, it is yet to be determined whether the space-tourism industry can now develop into a viable and profitable economic entity. Proponents of developing commercial space travel and related businesses have often served as "their own worst enemies" by relying upon dramatic rhetoric and unsupported assumptions to champion their cause, rather than verifiable, factual, and responsible business planning.

The true potential of space tourism will be realized when there is a growing market of millions of passengers paying a few thousand dollars, rather than a handful of wealthy individuals paying millions to visit low Earth orbit. A major barrier preventing affordable space access is that proponents of space tourism, while claiming the need for a passenger-certified, cost-effective reusable launch vehicle (RLV), have not fully integrated these new space-transport vehicles into their business plans. For example, these advocates usually only mention that an RLV is the vehicle of choice. Additionally, the RLV industry initially distanced itself from the space-tourism market, placing its focus on the satellite-launch industry. Fortunately, this is finally changing with the realization of economic potential for space tourism when compared to the limited profitability presented in launching satellites. For the space-tourism market to realize this potential, building a cost-effective passenger RLV must be a priority. Additionally, a strategy for, and relationship of, cooperation between the RLV and space-tourism industries must be nurtured to effectively build and operate a safe and efficient fleet of RLVs.

Tito is more than just a symbol of momentous progress to the space-tourism industry. As a business and financial expert, he can also provide much-needed industry leadership and energy. While his contribution to space tourism is important, the industry must now do its share to ensure

its own successful development. The discussion points and recommendations set forth in this paper are offered to facilitate meeting this challenge. They can also be useful in expediting developmental plans for sending people to Mars in the near future.

As a result of the terrorist attack against the United States on September 11, 2001, the development of space tourism faces additional hurdles not previously considered. While predicting the full range of impact these attacks had upon the industry is not possible at this time, this paper highlights reasons why the development of space tourism should remain a priority, not just for industry advocates, but for all people across the globe. These reasons include the well-documented fact that seeing Earth from space has a positive transformative effect upon the viewers, as well as their circle of friends and associates. Additionally, after forty years in space, nations that were former adversaries are now partnering to strengthen efforts toward space development.

Introduction

When Dennis Tito visited the ISS in May 2001, several important milestones were achieved and publicly declared throughout the world. These included the fact that a middle-aged civilian astronaut could easily handle space travel, that a space-tourism market did indeed exist wherein an individual was willing to pay approximately $20 million of his own funds to visit space, and that there was no longer a valid reason to discount the notion of space tourism. Not only had Tito become the first paying tourist, but major space-faring nations and regions, including Russia, the United States, and the European Space Agency, have begun planning the systematic development of a space-tourism industry. In addition to demonstrating the viability of commercial space travel, Tito's journey into space revealed for the first time the problems within NASA related to the development of the industry, opening the agency and this issue to public scrutiny. These problems exist despite NASA's own research indicating the enormous profitability potential of future space tourism.

Many advocates of space tourism believe that the Tito flight will "jump-start" the space-tourism industry, helping to introduce others to space travel and facilitate growth for related business ventures. It is evident that a push is on for others to visit the ISS. The Russians have even announced plans to develop a commercial space-tourism industry to service this new market. The ISS partners have now issued guidelines surrounding visiting space tourists, and the United States, as the major ISS partner, has even proposed specific legislation. Even with these positive steps, there remains no existing RLV or other cost-effective way to safely transport people to and from space.

There are key questions continually asked regarding the viability of space tourism. They are asked by professionals both within and external to the space-tourism industry in the financial, marketing, and political communities. Their concerns can be best addressed in a properly constructed, comprehensive business plan. Some questions cannot be answered definitively at this time; however, knowledge of the concerns can aid developing space businesses in addressing the issues in their planning stages and efforts to raise capital. The following list enumerates some of the most pivotal questions:

1. Can the space-tourism industry develop into a profitable economic industry?

2. Can proponents of space tourism cease defeating their own purposes by relying upon dramatic rhetoric and unsupported assumptions in favor of facts, verifiable assumptions, and financial forecasts?

3. Are challenges related to financing, marketing, business methodologies, or a combination of all of these facets?

4. Can the proponents of space tourism adhere to proven business tools and methodologies in their presentation of an acceptable business plan to the financial and business communities?

5. Can a cost-effective, certified passenger RLV be developed for space tourism?

6. Can the RLV and space-tourism businesses work together to build an industry operating a safe and efficient fleet of RLVs?

7. What effects will there be on RLV and space-tourism businesses if NASA begins selling seats on the U.S. Space Shuttle to civilian space tourists?

8. How will current events affect the development of space tourism?

Answers to most of these questions should be provided by business managers and executives promoting their space-tourism ventures through an effective business plan. Therefore, a major focus of this discussion centers on the necessity for such companies to have ready a professionally designed and thoughtful business plan to facilitate business financing and the development of their operating plans.

Resolving the problems associated with transporting people to and from space in a cost-effective vehicle—most likely, the RLV—will be crucial to the successful development of this industry. Suggestions are set forth in this paper that have the potential for a positive impact on both the RLV and space-tourism industries. In addition to examining business-plan requirements, recent legislative efforts supporting space tourism will also be investigated. The critical importance of space tourism will also be discussed in light of new priorities facing not only the United States, but the entire world following the September 11 attacks on this country.

The Business Plan

An effective and informative business plan is essential for any company seeking financing and/or developing their own operating plans. The more comprehensive the plan, the greater the evidence of thoughtful investment in the venture. Comprehensive planning enhances the likelihood of financing. Furthermore, the business plan often forms the nucleus of information required by state and federal security laws; therefore, careful attention to ensuring the inclusion of all relevant information, fully disclosed and discussed, is important. Unfortunately, the business plans of companies involved in space tourism and related businesses

are commonly weak and would not be funded under any circumstances. As a result, it is important to discuss the contents and the purpose of key sections of an effective business plan.

While the exact contents and structure of business plans vary, financiers and investors are accustomed to evaluating certain expected sections. Most commonly, these are an executive summary, a thorough description of the company and its product or service, a market analysis and operations structure, and a description of existing competition. Also expected are biographies of key personnel and a comprehensive financial analysis with proformas, assumptions, and projections. Appropriate appendices should also be included along with a section explaining problems facing the company in the execution of its plan and resulting opportunities that could emerge from their successful resolution.

Business management must understand the marketing value of the business plan, in addition to its usefulness in formulating operating plans and objectives. As a well-designed plan serves to sell the company to the general business and financial communities, it is an invaluable tool in effectively "opening doors" that may otherwise be closed or difficult to access. Management must also be astute to the fact that most reviewers of their business plan will not read it in its entirety. As mentioned earlier, particular sections should receive primary attention.

Organization

Executive Summary

The Executive Summary is critical because, in no more than two or three pages, the needs of the business and the expectations of the investor must be fully explained. In turn, investors must know the benefits they can expect from their investment. The initial paragraph must be crafted in a manner holding the attention of the reader and enticing them into deeper review of the plan. This can often be accomplished via up-front provision of striking company performance data, which is then explained in greater detail and supported in the balance of the executive summary and remaining business plan.

Rhetoric is not useful in the Executive Summary. This section is the final piece to be constructed and is, therefore, the easiest because it is then simply summarizing in succinct brevity the text already developed in more detailed areas of the plan. Unfortunately, most executive summaries contain far too much information and are simply redundant with the balance of the business plan, rich in rhetoric and lacking in substance and fact. Relevant information providing a clear understanding and appreciation for the venture is critical to the Executive Summary. The Executive Summary of space-tourism business plans are all too often designed to advertise, and build the egos of, those promoting the business. When this occurs, the likely reaction of financial professionals is to go no further in their consideration or evaluation of the proposed venture. Thus, the Executive Summary is very revealing in terms of more than solely the experience and expertise of the business. If this descriptive section falls far outside the norm or expectations of reviewers, it can be very damaging for the venture.

Marketing Section

The marketing section of the business plan is crucial and must be carefully constructed to ensure current, as well as comprehensive, data. When discussing market analysis, it is essential to include both recent and verifiable data to clearly illustrate that the market is of sufficient size to warrant development of the business and to enable the targeted sales and return on investment (ROI). If market research is used, great effort should be taken to ensure it is current and free of bias, or any existing bias should be fully documented along with the impact it might have on the data under evaluation. Incorporating such market research can be challenging for space-tourism companies because some of the most frequently cited research now dates back to the early to mid-1990s. Additionally, the market research most often cited to support space tourism relies upon an indirect approach to estimate the size of the market at a given "ticket price to orbit." For example, almost all market studies view the projected price of a ticket in terms of a percentage of the population base willing to spend that amount of money. They do not actually estimate the size of the overall potential market. A few older studies do attempt to estimate the size of the space-tourism market; however, not for a market willing to spend less than $500,000 per ticket and produce 200 customers per year. A recent 2001 study conducted by Kelly Space and Technology, along with the Teal Group Corporation, Space Ad Ventures, and Harris Interactive (http://www.spaceadventures.it/KST-tdf.pdf), estimated the size of the space-tourism market via a survey of their sample population, which found that 2% of the sample expressed a willingness to pay $10 million per ticket for a ride to orbit. This type of conclusion is naturally difficult for the financial community to rely upon in terms of market size and growth potential.

Details surrounding the marketing operations of the venture must also be provided in the business plan. Different from the analysis and conclusions drawn from the research, this section offers a detailed explanation of how the company plans on delivering goods and services to its customers. Space-tourism business plans often omit this discussion despite its importance. Not only is it harmfully insufficient to simply offer existing market research as evidence that a growing, sizeable, and profitable market exists for space tourism, but it is a failure to explain how the company anticipates capitalizing on this market. For example, vehicles are needed to transport passengers safely to and from orbit. Therefore, the potential investor must be informed of not only how such trips are going to be priced, but also how they will be marketed and distributed. The number of trips planned and whether market growth will be sufficient to meet projected ROI are also critical pieces to a financier.

Financial Section

While most business plans contain a financial section, such data is typically incomplete. Detailed and comprehensive proformas for a recommended five to seven years of operation are often lacking, as well as investor ROI; the exit strategy most likely available to the investor with its anticipated results; assumptions and explanations to support every item on the proforma; and properly prepared company financial statements, preferably compiled by an independent accounting firm in accordance with generally accepted accounting standards. Most often, this section contains unsupported rhetoric surrounding expected profits or large dollar amounts for future sale of the business. This type of unsupported, subjective information is harmful to the general goals of the business plan.

Investors seek verifiable financial information whenever possible. This can be a challenge for space-tourism companies, given both the newness and uniqueness of their industry. Management must find a way to provide information to the investor that can be verified and applied directly to the business seeking funding or, in anticipation of this requirement, they must offer an explanation to the investor that appropriately and completely responds to these concerns. Providing comprehensive and quality data can only add to the attractive nature of the venture offering and give the business plan a "competitive edge" with potential investors.

Management Section

Space-tourism businesses must be particularly attentive to their executive and management leadership. Not only does the quality of management relate directly to the probable success of the business, but the right kind of management can help attract needed capital. The founders of a company are usually not the best individuals to serve as operating executives for the business—a problem often reflected in space-tourism business plans. It is important for companies within this market to remember with every action that this is a completely new industry. The risks are higher with the greater number of unknowns, some of which may be political and legal, given the existence of treaties enacted by the United Nations that govern space activities among all nations, as well as other regulatory issues by the United States and other space-faring nations. Consequently, whether management is capable of not only successfully carrying out company operations, but also effectively managing all issues that could arise due to the present structure and regime of space commercialization, is of pivotal concern to investors.

A fundamental management requirement for space-tourism businesses is that key personnel have proven track records in similar types of companies or industries. While demonstrating a track record in building and operating a space-tourism business will be impossible, there are a host of businesses with a degree of similarity. Some examples include the travel and transportation industries and consumer-marketing companies. The importance of having executives in place with experience in these industries, as well as individual track records demonstrating a contribution to the profitable success of their respective companies, cannot be overstated.

An appropriate business plan will clearly identify management positions within the organization, along with the personnel holding these positions. Frequently, this requirement is addressed by indicating that particular positions will be filled upon receipt of the first funding installment. Unfortunately, this is insufficient and will mean very little to finance professionals evaluating the business plan or considering the venture for investment. It is always best to identify a specific individual who will be filling the position. If this is impossible, the qualifications required of the individual should be clearly described along with the type of background that will constitute an acceptable track record. By providing this degree of detail, any concerns or doubts surrounding the management team of the organization are deflected and do not become an issue during an investment analysis.

Founders of space-tourism companies and other new business ventures in the realm of commercial space, often bring with them scientific, technical, or engineering background, but little actual experience running a successful business, especially a business based upon the type of financing being sought. In these cases, proven executives should be added to the management team. This not only serves to significantly strengthen the management foundation of the business, but also demonstrates to investors the serious intentions of the founder in placing the best interest of the company as a top priority.

In addition to fully describing the operating management team, it is recommended that space-tourism businesses form a board of directors consisting of leading business people to play an active role in advising and steering the organization toward success. A strong board of directors significantly enhances not only the ability of the company to raise needed capital, but also its capabilities to successfully chart its direction and make important decisions rapidly and effectively. If a board of directors is not practical or appropriate for a particular business, an advisory board should be established—again, seeking members of the business community with proven track records in leadership positions. As with the board of directors, the function of the advisory board must be fully described with brief biographies of all members provided. An advisory board is less formal than a board of directors and does not carry the same level of responsibility or liability; however, either can, to some degree, compensate for weaknesses that may exist within the respective management team.

The management team of a space-tourism business should plan for, and identify, as many strategic partners as possible. A strategic partner is usually considered to be a business that forms a relationship with the company to meet mutual objectives. For example, a space-tourism company might seek strategic partnerships within the travel, entertainment, and hotel industries. A specific scenario might be a training facility for potential space tourists who would need transport from their point of origin to the facility. Strategic partners for the space-tourism business with the training facility could be a specific airline, hotel company, rental-car company, or a well-known travel agency—any or all of which could support the business with favorable pricing, services, and advertising. If specialized clothing were required for the trip and/or preceding training, a clothing designer could also become a strategic partner. Such partnerships can contribute invaluable name recognition, business credibility, and market reach. They can also be designed in a manner that allows the strategic partner to offset some of the company expenses. Developing quality strategic partnerships, and fully disclosing the details of the relationship, presents significant enhancement to a good business plan.

Overall Scope

A business plan must provide accurate, factual, and comprehensive information, as well as answers to fundamental questions that evaluators of the plan simply expect. Not only must the completed business plan convincingly and truthfully answer such important questions, but the management team must be able to answer the questions as well. This is a primary reason why active involvement in the development of the business plan by company management is so critical. Some of the key questions every business plan is expected to answer are

1. What are the products and/or services sold by the business?

2. What is the product pricing strategy and how was it derived?
   [In the case of a space-tourism company, the product would be the trip to orbit and any other supplemental services offered to the customer.]

3. What is the value of the business and how was it derived?

4. What are the precise capital needs of the business, and how will this capital be used?
   [Rhetoric is unacceptable. Details, facts, explanations, and the disclosure of the assumptions supporting the conclusions are required to answer this question.]

5. What are the financial projections, assumptions, and explanations for business operations?

6. What are the detailed assumptions, financial footnotes, and explanations that clearly explain and justify all data in the proformas or financial projections?

7. What is the intended market and its growth potential, and what is the basis for the data presented?

8. What are the probable changes in the respective market over the next five years, and what are the reasons behind the anticipated changes?

9. What is the existing competition of the business?

10. Have the working capital needs for the initial growth periods of the business been properly and realistically planned?

11. Are all reported sales new sales? If not, what percentage of them represent repeat business?

12. Have regulatory challenges and other barriers facing the business been thoroughly researched? What are the plans to successfully deal with these issues including the timing and cost factors?

13. What is the planned structure of the business including ownership details?

14. Who prepares the company financial statements and are they compiled, reviewed, and/or audited by a certified accounting firm?

15. What are the potential problems and opportunities facing all aspects of the business?

16. What is the ROI the investor can realistically expect, and over what time period?

17. What is the exit strategy and when is it to be implemented?

This is not all inclusive of the data investors expect addressed in every business plan; however, it is a good foundational synopsis. Management must conduct a comprehensive review of its business and anticipate all further questions that could possibly arise and ensure they are proactively addressed in the plan. Upon completion of that exercise, it is essential to ensure that the text of the business plan actually addresses the questions accurately and completely. The plan will then not only provide important and relevant information to those considering the business as an investment, but it will present the company as a business run by professionals and concurrently serve to build confidence within the management team. This is especially important for a space-tourism business plan, given the newness of the industry and the associated risks.

Financial Sources and Types of Financing

Company management must demonstrate knowledge surrounding sources of financing, the types available to the company, and the types that will be sought. While this seems basic, most of this information is commonly omitted in the typical business plan. Knowing where to go for financing is not limited to which bank should be approached for a commercial loan. The company should illustrate how its management has considered and evaluated all options including foreign sources of capital, "angels," and domestic venture capitalists, in addition to traditional banking sources. Perhaps the company will prefer a combination of these sources. This will largely depend on the type of financing the company is seeking, marketing and timing conditions, and the specific legal requirements pertaining to these various sources of capital. In addition to having clear direction as to available sources of needed capital, the company must consider raising its capital as debt, equity, or a combination of both. Debt financing through the issuance of bonds may be beneficial with specific advantages for the company. Bonds can often be structured to defer interest payments or convert to equity at a later date, thus negating the need to reduce debt via company funds.

As the company identifies probable sources of capital, it must ensure compliance with all appropriate state and federal securities laws. If foreign sources of capital are sought, foreign laws must also be considered. All such information must be disclosed in the business plan. While these issues may not be a priority for those evaluating the business plan, it is essential for management to be intimately familiar with all applicable legal requirements and ensure that the company is properly positioned for adherence. This becomes far more complicated after the fact.

It is also important that the founders are not overlooked as a source of financing for the company. While it is doubtful they could sufficiently fund the company during its initial operating period, such a personal financial commitment to the business would be a positive factor to investors and a fundamental issue typically investigated. If this commitment is not there, potential investors will often take the position that the company is not worth their investment. A financial stake in the company by the founders also demonstrates their probable commitment to remain supportive of the company through the inevitable challenging periods. This is an important aspect of the business plan so care should be taken that the details of the founders investment are clearly disclosed.

Presentation

When the business plan is ready for distribution to potential investors, specific guidelines for its presentation should be considered. An effective presentation will be brief—a maximum of twenty to thirty minutes. A multimedia, factual video is recommended to supplement the presentation. Professional development of the video is suggested to achieve a quality and content that will capture and hold the attention of viewers with factual data as opposed to rhetoric and marketing or public-relations fluff. PowerPoint slides are not recommended because of the technical difficulties the software often introduces and, hence, the unnecessary consumption of valuable presentation time. The adverse impression this can also create is avoided with a video that can be repeatedly reviewed whenever it is most convenient for the viewer.

During the presentation of a business plan, the major points must be addressed—a full description of the business, a description of the management team and the individual attributes each member contributes, the amount of capital sought, how the funds will be used, and the ROI the prospective investor can expect and over what time period. Further, the investor should be informed of worst, average, and best ROI expectations with a full description of the exit strategy and what a successful exit strategy means for the investor. If it becomes evident that investment participation is not appropriate at the time of the presentation, a follow-up meeting should be immediately scheduled.

Reusable Launch Vehicles

Despite the success of the Tito flight and the likelihood that several other space tourists will follow Tito to the ISS aboard the Russian Soyuz, there is no cost-effective space vehicle that can safely transport visitors to and from orbit. Operation of the U.S. Space Shuttle is far too expensive to be considered a commercial vehicle and NASA policy currently prohibits civilian astronauts as passengers. Because the Soyuz can only accommodate one passenger and two crew members, it does not have the capacity to play a significant role in the development of space tourism other than to show the world that demand for such tourism indeed exists, even at prices of $20 million per trip.

Russia has indicated an interest in revising its own shuttle program, which was initially based upon the U.S. Space Shuttle and referred to as the Buran. It did not become operational in Russia, but the program could be readily resurrected and redesigned to service the space-tourism market. While the Buran would be far less expensive to operate than the U.S. Space Shuttle, it would still not provide a cost-effective alternative, nor would it possess operating characteristics similar to those of a commercial airplane. It is just those characteristics that are needed if space tourism is going to grow and prosper as a developing industry. These characteristics include airline-type turnaround between flights, routine maintenance and operations, and the ability to use any commercial airport, among many others.

NASA has mentioned a possible change in policy to allow tourists to fly in the unused seats aboard the U.S. Space Shuttle. This could present a potential problem for the development

of the space-tourism industry. While it would create higher visibility and credibility for the industry, it would place NASA in a position of authority over the selection process in terms of individual passengers. It would also make it very difficult for a company within the private sector to obtain financing for its own RLV because, in essence, it would be competing in the same marketplace as the U.S. government—a daunting challenge within any industry. Additionally, frequent flights with space tourists aboard would not be possible with the U.S. Space Shuttle, given its operating characteristics, turnaround time, and mission-planning status reported by NASA. Finally, since NASA intends to remodel the shuttle and keep it operative for perhaps fifteen more years, its use to take tourists into space might serve to delay the development of a true, cost-effective commercial RLV.

Developing a passenger-certified RLV is proving to present a difficult challenge. Not only are there engineering and technical hurdles to overcome, but financing for such projects is virtually nonexistent. Additionally, the safety-certification requirements remain unknown. In years past, the target market for many of the start-up RLV companies was that of satellite launches—either the constellation satellites thought to be the coming market forerunner, or the existing launch industry. The constellation-satellite market disappeared with the bankruptcy of Iridium and ICO and the delays faced by Teledesic and other companies. With approximately fifty commercial-satellite launches per year, and a very competitive expendable launch vehicle (ELV) market to service the launches, RLV companies have finally begun to perceive space tourism as the only market large enough to warrant the development of their vehicles.

Although the change in focus to space tourism has been slow in coming, it has always been clear that the satellite markets were insufficient on their own to drive the development of an RLV. Some knowledgeable commercial space experts and RLV companies felt that their RLV could actually capture large portions of the existing launch industry by substantially lowering the cost involved in placing a satellite in orbit using the RLV; however, this ignores certain market realities. These realities include a surplus of ELV capacity that will remain a factor for years. Consequently, launch prices are falling. Some ELVs, such as the Russian Proton, other Russian rockets, the Chinese Long March, and the Boeing Sea-Launch, are priced considerably lower than their Delta, Titan, and Arianespace counterparts. If an RLV existed, the aim of its pricing strategy would not be to significantly undercut its competition because that would reduce its own economic performance and the ROI required by its investors. Rather, RLV owners would be expected to price their vehicle under existing launch prices, although it is unclear if the resulting cost would equate to the Proton price or the much higher cost of the Delta, Titan, or Arianespace.

Boeing and Lockheed—manufacturers of the Delta and Titan, respectively—as well as Arianespace, are in a far stronger position to sustain a price war on launch prices than a new RLV company that must produce rapid results for investors. There is very little incentive for Boeing and Lockheed to develop an RLV at this time because the Delta and Titan ELVs are highly profitable and the Boeing Sea-Launch consortium is also profitable. Boeing and Lockheed share in the $7 billion management contract for the U.S. Space Shuttle and will benefit as primary contractors for the remodeling of the shuttle so it is to their advantage to keep it operating as long as possible. Arianespace is the most successful commercial ELV in the world today so there is little incentive for this company to develop an RLV, which in theory, would

have only one or two vehicles servicing the entire annual commercial-launch volume of the industry.

The RLV is essential for the development of the space-tourism industry. A merging of interests between the RLV and space-tourism industries is essential for each to develop in a prosperous manner. A strategy to work together to contribute in a comprehensive manner to current market data is important because investors have difficulty accepting existing space-tourism market research. The difficulties in accepting this data relate to the age of various market studies, characteristics of the surveys implemented and their methodologies, and the fact that the numbers indicate an interest in visiting space so high that it tends to be discounted. A partnership strategy would facilitate financing, market verification, and development for both industries. To separate their efforts would be counterproductive and undesirable. Only with verifiable market information as to the size and growth potential of the space-tourism industry, along with credible business plans prepared by RLV and space-tourism companies, can these industries raise necessary capital. Financiers will look to the fundamentals in deciding whether to invest in either industry and credible market research will provide the basics for presentation of these fundamentals. These two industries share a symbiotic relationship and the sooner it is understood and positively exploited, the sooner we will have an RLV servicing the space-tourism industry.

Supporting Legislation and Policy

The Dennis Tito visit to the ISS sparked many changes in NASA and ISS policy. It also prompted Congress to propose two new pieces of legislation with the potential to make a positive difference in expanding space commerce and tourism. The ISS partners, including the United States, established rules for space tourists visiting the station. The rules are not nearly as important as the fact that this is yet another acknowledgement that space tourism is a reality. Prior to the Tito flight, the ISS partners did not even contemplate space tourism; it is now a practical consideration.

Two recent pieces of legislation supporting space tourism and a cost-effective U.S. commercial space-transportation system have also been proposed in the House of Representatives since the Tito flight. The first bill, H.R. 2177—the *Invest in Space Now Act of 2001*—was proposed in the House of Representatives on June 14, 2001. This bill amends the 1986 Internal Revenue Code to support and encourage the development of a cost-effective, American space-transportation system to increase the competitiveness of the U.S. commercial space industry and to expedite opening space to access by the American people. This bill was referred to the Committee on Ways and Means where it is still being considered. HR 2443, known as the *Space Tourism Promotion Act of 2001,* was proposed in the House of Representatives on July 10, 2001. This bill specifically targets space tourism as a significant new industry and spells out ways in which the federal government can support this market. The bill is also a direct result of the Tito flight and is the first ever of its type to be proposed in the U.S. Congress to specifically promote space tourism. This bill was referred to both the Committee on Ways and Means and the House Committee on Science where it is still being considered.

Although each has its faults, the two bills described represent positive steps toward development of the space-tourism industry. It took an event such as the flight of Dennis Tito aboard the Russian Soyuz to the ISS to motivate the proposition of these bills in Congress. As space tourism becomes even more visible with others following the Tito path to orbit, it is possible that even more favorable legislation will be introduced, eventually passed by Congress, and signed into law by the president. Moving congressional leaders and members to look with favor on this type of needed legislation is an important consequence of the Tito flight.

Current Developments

To date, it is far too early to determine what effects the recent terrorist attacks of September 11, 2001 on the United States will have on space tourism or any commercial space-development program, nor can anyone predict with any degree of accuracy what the continued threats of terrorism, the U.S. war against terrorism, and the ensuing economic problems portend for space commerce. However, what is clear is that changes are underway and it is reasonable to expect that these changes will involve efforts to develop space tourism and related commerce. While the reasons for developing a space-tourism industry are just as viable as ever, priorities are expected to change as are the appetites for risk-oriented ventures. Space tourism is destined to develop; however, recent events point to development on a much different timetable over a much longer period of time. For the time being, as much a result of the present economic difficulties in the United States as the renewed threats of terrorism, financing for space tourism and related businesses will be more difficult to obtain. Not only will attention be diverted from earlier priorities, such as space travel, but it will be focused more sharply on essentials and less risky, more established investment opportunities.

The horrific events of September 11, and what may still come, actually help make the case for humans in space. As mentioned earlier, from space, individuals experience the well-documented effect known as the *overview effect,*—a term coined by Frank White, author of *the Overview Effect: Space Exploration and Human Evolution, Second Edition*, published in 1998. This publication describes the transformational experience that commonly follows observation of Earth from space—Earth free of borders and conflicts. When astronauts return to Earth, they all typically share the same transformational experience. A growing, successful space-tourism industry could bring perhaps millions to space who would, in turn, share this experience with others. This could have a powerful positive impact on our world. Space tourism is as important as ever, perhaps even more so than it was prior to September 11, 2001. Its importance goes beyond its potential economic value as a new industry when it can facilitate a new view of our world, bringing its people together and forming partnerships from former enemies as space remains outside the framework of human violence, hostilities, and war.

As we sort out this new world in which we find ourselves, we should not lose sight of the powerful contribution that space tourism can make toward the betterment of us all. While it is understandable that it may take longer to develop or be more difficult in the short term to finance than industries previously born, it is as important now as it was before the attacks on our freedoms, perhaps even more so. Undoubtedly, it will take time to sort out the changes we will

face; however, “when the dust settles,” space tourism should prevail as a priority for economic development and contributing to the positive transformation of our world.

Conclusion

Space travel is difficult, costly, and risky. A supporting space infrastructure does not yet exist. Competition for financing is tough because space ventures must compete for a finite supply of funds along with terrestrial investment opportunities. This competition creates an extra burden on space ventures with both real and assumed risk factors that are higher than those of terrestrial counterparts. Therefore, the space business venture must meet and surpass most terrestrial business standards. As mentioned earlier, space business executives must increase their professionalism and not rely upon space as the primary selling theme. While there are angel financiers that will invest solely due to their love for space, such financing will be insufficient to fund new ventures toward the development of a profitable industry. It is important for space-tourism business executives to understand that their product is not space; it is travel and dreams and adventure and excitement, just like the terrestrial travel industry. The ventures will be financed on fundamentals, on expected ROIs, and on market conditions—not on the fact that the business is conducted in space.

Aggressively and actively supporting the passage of pro–space-tourism and commercial space legislation, including various tax and incentive programs, is important. In these times of uncertainty and added risks to the fundamentals of our freedom, space tourism holds great promise—not just for the economic prowess it can bring to peoples around the world as the industry successfully develops, but for its very nature of a vehicle for people to see where they live, to see Earth from space, and experience the overall transforming effect. This can only facilitate positive changes for those living on this planet.

The Dennis Tito flight was important for all the reasons described in this paper, and for emotional and sentimental reasons as well. The space-tourism industry itself must now become more professional in its efforts to develop unique business ventures. In doing so, space tourism can capitalize on what Dennis Tito conceived, thus ensuring that this new industry, with such enormous promise, develops sooner rather than later.