DOING BUSINESS IN SPACE: THIS ISN'T YOUR FATHER'S (OR MOTHER'S) SPACE PROGRAM ANYMORE

James E. Dunstan, Esq.
Garvey, Schubert & Barer
Washington, D.C.

Abstract

The past two years have witnessed dramatic changes in commercial space. This paper will review the changes that have occurred within the U.S. and Russian space programs, and examine the current business environment in space. Commercial space stands at a pivotal point in history: Still dependent upon traditional launch providers (and thus high costs); still required to deal with government agencies for access to on-orbit manned facilities; and facing daunting odds at finding financing for projects in light of the "dot-dead" technology-driving stock market. Yet victories are being achieved in rapid succession. This paper will conclude with a look at what changes are necessary to ensure that the true private commercial space economy we are beginning to see will mature.

I. Introduction

One of the benefits of holding a conference once every two years is that it allows enough time between gatherings for significant events to occur. The two years since the 1999 SSI Conference has produced significant changes in commercial space. As we met in Princeton in May, Dennis Tito, the first paying "citizen explorer" had just returned to Earth from the International Space Station, itself not truly in existence two years ago. Also on board ISS are now two "Father's Day" gifts, provided and paid for by RadioShack, which is emerging as the first consumer products company to consistently support space enterprise. Both Tito and these gifts would have been delivered to the "commercial" Mir space station, except the Mir was deorbited just a month ago. As Bob Dylan would say, "the times, they are a changin."

II. Human Space Commercialization: Forty Years of Wandering the Desert

On April 12, 2001, we celebrated the 40th anniversary of the human species' first foray into outer space, the launch of Yuri Gagarin. This flight was a marvel of technological achievement for the former Soviet Union, and a further shock to the United States still reeling from the launch of Sputnik four years before. Those two events launched the "space race" which culminated with the Apollo program. In the process, however, the United States civil space program focused solely on building the infrastructure necessary to put a man on the Moon, not on the infrastructure necessary for fostering a manned commercial outbreak of activity in space.*

With the development of the Space Shuttle in the late 1970s, we were promised the opportunity for commercial development. The Space Shuttle was dubbed the "Space DC3," a workhorse vehicle that would provide routine access to space, and available for commercial activities. The shuttle could provide small "Getaway Special" ("GAS") cans to fly experiments cheaply. Commercial payload specialists were invited to "come aboard" to conduct experiments on crystal growth and other activities of interest to the commercial sector. Early recovery of the Palapa B-2 satellite in November, 1984, following a partial launch failure, demonstrated that the shuttle could perform rescue and repair missions. President Reagan even went so far as to sign a Presidential decree requiring all commercial satellites to be launched from the shuttle, to ensure a steady supply of payloads to keep the flight rate high enough to justify the turnaround expense. Ultimately, NASA deemed the shuttle safe enough to fly "average" citizens, first two Congressmen, and then, on January 28, 1986, a teacher, Christa McAuliffe aboard the shuttle Challenger. And then the door to commercialization slammed shut.

Following the Challenger disaster NASA put most thoughts of commercialization on hold. Indeed, safety became the only watchword for the shuttle, and its flight rate dropped from nine flights in 1985 to less than six in the first three years after flights resumed in 1988. Without a steady stream of comsat payloads, or other commercial interest, the shuttle was left with only two missions: government scientific research,

* For a full discussion of the political history of the space race, *see* W. McDougall, *The Heavens and the Earth: A Political History of the Space Age,* Basic Books, 1985.

and, construction of the often delayed, often redesigned, and always over budget space station. Gone was talk of any real commercial activity aboard the shuttle, and certainly gone was any hope of flying "average" citizens. The emotional scars of the Challenger disaster still linger today, fifteen years later.

III. The Dawn of True Space Commercialization

In the two years since the 12th Princeton/SSI Space Manufacturing Conference, there has been a fundamental change in the dynamics of commercial space development, unparalleled in history. Several major catalysts have spurred these changes, covered here roughly in chronological order.

A. The Rise of MirCorp (and the Fall of Mir)

In dismantling the Soviet Union, the new Russian Federation inherited a vibrant, efficient, ***and cheap*** space program. The same program that had beaten the United States both to launch the first satellite and orbit the first human, had an arsenal of rockets which while lacking in technological sophistication, were reliable, and could be mass-produced at a fraction of the cost of western launchers. The Russian space program also had an orbiting space station, Mir, whose core module was launched in 1985, but which had been continually upgraded over the years. While the western press seized on every small glitch onboard the station as a sign of the decay of the last bastion of communism, the fact is that the Mir survived the fall of communist Soviet Union and flew on while the United States' space station fell further and further behind schedule and over budget.

Russia's only problem – paying for its space program, and paying for the operations of the Mir. In late 1999 several individuals recognized this unique opportunity to jumpstart space commercialization and formed MirCorp. They approached the Russian Space Agency Rosviakosmos (RSA) with an offer – lease the Mir to MirCorp in exchange for desperately needed operational funds. In order to make this happen, MirCorp needed RSC Energia, the builder and operator of the station, and in exchange for its expertise and access to RSA, the founders of MirCorp gave a majority share of the company to RSA.*

This author drafted the lease for the Mir space station, based on a simple residential apartment lease. Mir was, after all, six rooms with an incredible view! The deal was signed in February, 2000, and MirCorp immediately began to market the capacity of the Mir. Finally, there was a commercial space station available.

MirCorp's first major contract was to fly California millionaire Dennis Tito to the Mir. Negotiations were soon underway for additional paying passengers, as well as commercial experiments. NBC announced during its Summer Olympics coverage in Sidney, Australia, that it had secured the rights for "Destination: Mir," a reality-based series to be produced by "Survivor" producer Mark Burnett.

Yet MirCorp still faced a significant hurdle – convincing the investment community that a space station could be operated at a profit, in the face of a nationally-sponsored space station that was constantly over budget and projected to cost close to $100 billion to build and maintain throughout its life. As MirCorp struggled to raise an additional $100 million to begin refurbishments to Mir, RSA announced that it would deorbit the venerable space station in early 2001. RSA was receiving relentless pressure from NASA to dump the Mir and focus its meager financial resources on the International Space Station (ISS).* Ultimately, RSA caved to the pressure from NASA and in March, 2001, the world bid a fiery goodbye to Mir as it was deorbited in the southern Pacific Ocean.

The end of Mir did not mean the end of MirCorp, or the end of Dennis Tito's dream to fly. The mold had been broken, and the paradigm shifted.

B. RadioShack Jumps Into the Space Game by Sponsoring LunaCorp

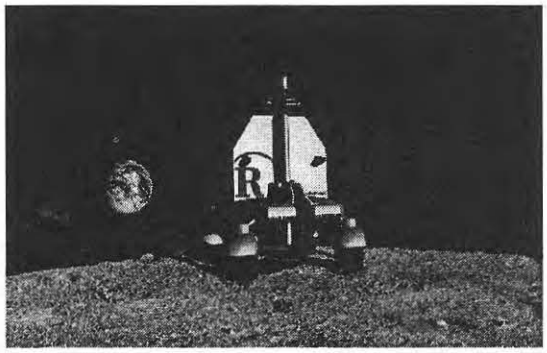
The second major event in the last two years to spur space commercialization was the announcement in June of 2000 by RadioShack that it was going to become the first major sponsor of LunaCorp's planned private Icebreaker mission to land a rover on the Moon to search for water-ice deposits, and also serve an entertainment market.*

---

* For more information about MirCorp, visit its web site at http://www.mirstation.com.

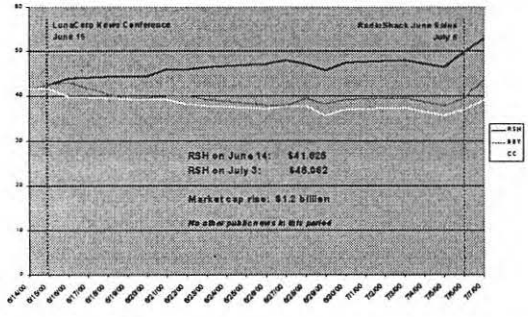
* The Space Frontier Foundation challenged NASA's heavy-handed tactics toward the Russians, claiming that Mir had been "bulldozed" to make room for ISS, and ensure that NASA had no competition in space activities. *See* http://www.space-frontier.org/MEDIA_ROOM/NEWSREL/2001/mirnews.html

* *See*, http://www.lunacorp.com. For the sake of full disclosure, the reader should be aware that the author of this



On June 15, 2000, LunaCorp and RadioShack held a press conference at the National Press Club in Washington, D.C. to announce this historic partnership. RadioShack committed up to $1 million in first year funding to LunaCorp's efforts, with additional amounts as plans progressed.* RadioShack's interests were not altogether altruistic – they recognized the brand building opportunity an actual space adventure could provide. "This project presents not only an original branding opportunity for RadioShack as opposed to signs in baseball stadiums, but also allows us to provide an educational and personal involvement opportunity for nearly one million customers who visit RadioShack every day," said Jim McDonald, senior vice president of marketing for RadioShack.

Wall Street's reaction to this innovative marketing ploy was swift and positive. In the two weeks following the announcement, RadioShack added more than a billion dollars to its market capitalization. Equally important, for that two week period, RadioShack's stock sped ahead of rivals Best Buy and Circuit City, stocks that it had been in lockstep with over the preceding year.



The imagination barrier once again was broken, and the stage was set for actual commercial activities in space.

C. NASA Gets In the Game with Space Act Agreements

Seeing its former enemy the Soviet Union commercializing Mir, NASA looked to energize its own commercialization efforts by entering agreements pursuant to paragraphs 203(c)(5) and 203(c)(6) of the 1998 Commercial Space Act, which call for NASA to commercialize the space station to the full extent feasible.

In its first "Space Act" Agreement, NASA entered into a contract with Dreamtime Holdings, Inc. ("Dreamtime"), through which Dreamtime would provide certain HDTV cameras and connectivity to the ISS in exchange for the rights to a certain amount of on-orbit astronaut time, and the rights to digitize the NASA archives.* NASA was to receive 25 percent of the stock issued by Dreamtime pursuant to an Initial Public Offering ("IPO"), an event that has not taken place as of June 1, 2001.

Dreamtime has made some use of the astronauts onboard the ISS to make weather announcements for The Weather Channel, as well as providing the opening sequence for the 2001 Academy Awards show, where host Steve Martin appeared to be jettisoned out an airlock from ISS, to appear on stage at the telecast. Dreamtime has been stymied, however, by NASA regulations which preclude the appearance of astronauts in television commercials, discussed in more detail below.

Dreamtime also has failed to deliver the HDTV cameras required under its agreement with NASA, and, in fact, has had to "borrow" NASA's own cameras for astronaut training. In a May 18, 2001, report to the NASA Administrator, the Inspector General's office found significant problems with the way the Dreamtime Agreement was being implemented, and called on NASA to provide significantly more oversight of Dreamtime's activities.*

The answer to problems with the Dreamtime agreement, however, is not more government

paper is a founding board member of LunaCorp, and serves as its Executive Vice President and General Counsel.

* For the official Press Release of the event, *see* http://www.lunacorp.com/PressRelease_061500.PDF

* *See,* http://www.dreamtime.com/home.html.

* A full copy of this report can be found at http://www.hq.nasa.gov/office/oig/hq/inspections/g-01-016.pdf

oversight. Indeed, it is oxymoronic to conclude that poor performance by a commercial partner under a commercial contract can be cured by adding additional layers of bureaucratic oversight. Indeed, the opposite should be true – if the commercial "deal" is not working, then NASA should get out of it, and put the contract back up for competitive bid.

In the second Space Act agreement, NASA entered into a contract with SkyCorp of Huntsville, Alabama, announced on October 20, 2000. NASA will allow SkyCorp to construct a satellite aboard ISS, and use NASA astronauts to deploy it from the ISS during an EVA where the astronaut will give the satellite a gentle push away from the space station.* SkyCorp currently envisions a February, 2002 launch date for its first prototype satellite, and hopes to build a constellation of LEO satellites to serve the Third Generation (3G) market for wireless Internet access.

IV. 2001: A True Space Odyssey

Space commercialization is a far cry from that envisioned by Arthur C. Clarke in his seminal fictional work *2001: A Space Odyssey*, where average citizens boarded a PamAm shuttle bound for a Hilton Hotel aboard a Van Braun "wheel" space station, then traveled to a mixed-use government/private lunar base, and then climbed aboard a government research vehicle headed for deep space. The year 2001, nonetheless, has seen a rapid acceleration of commercial space activities following from the successes of the year 2000, culminating with the Soyuz TM-32 taxi mission to the ISS which carried Dennis Tito, the first private citizen to pay his own way into orbit.

A. Dennis Tito: The Determined "Tourist"

When NASA successfully pressured RSA into deorbiting Mir, it thought that it would no longer need to worry about Dennis Tito, who wanted to become the first private citizen to pay his own way into space. NASA severely underestimated the resolve of Mr. Tito, the limberness of MirCorp, and the desperate condition of the Russian space program.

When we last left MirCorp, it held a commercial lease for the Mir space station, and a contract with Dennis Tito to fly him there. Once it became clear that RSA would deorbit Mir before MirCorp could fly Mr. Tito, MirCorp, and its majority owner, RSC Energia, turned their sights on flying Tito to the ISS, using the third, and empty, seat of the TM-32 Soyuz "taxi" mission in May, 2001. As it turns out, the on-orbit lifetime of the Soyuz capsule used as the crew escape mechanism for ISS is only six months, and so every six months the Soyuz capsules must be swapped out. Since only two Russians are required to fly the Soyuz, this left the third seat available for a paying customer, Mr. Tito.

The Tito flight has been well documented in the press and need not be discussed in great detail here. What ***is*** important in this context is that despite every attempt by NASA to scuttle the mission, money talked, and Tito flew in May, 2001. Why Mr. Tito's reported $20 million became so important is discussed below in Section V.

B. The RadioShack Father's Day Commercial

Dennis Tito was not the only commercial package that flew to ISS in May, 2001. Onboard the TM-32 Soyuz was also a RadioShack bag, and a videocassette to film a Father's Day commercial, the first commercial filmed entirely in outer space. How this commercial was pulled off is an abject lesson in minefield walking, and highlights the still highly political nature of commercial spaceflight.

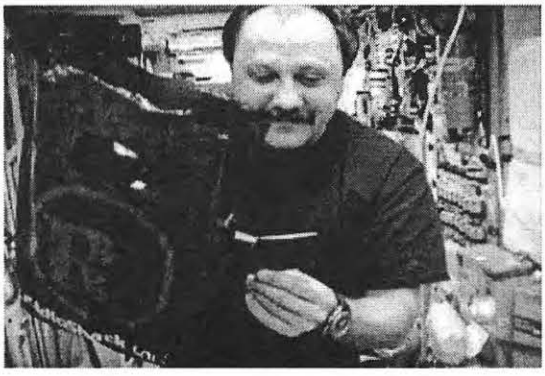
RadioShack wanted a space success story in the year 2001, to follow up its June, 2000 announcement of sponsorship of LunaCorp's Icebreaker mission to the Moon. LunaCorp came up with the idea of flying a small payload to ISS and filming a commercial onboard the station. The payload chosen was a small talking picture frame.

The problem was that RadioShack agreed to do this in March, 2001, less than two months prior to the launch of the TM-32 taxi mission. LunaCorp quickly signed an agreement with Energia and MirCorp to fly the payload, and then began the process of "space qualifying" the picture frame, which in this case involved replacing the PVC-wrapped wires with

* *See* http://www.skycorpinc.com.

Teflon, and coating the circuit board with special shielding to guard against any possible outgassing in case the picture frame was subject to a vacuum.

LunaCorp then prepared picture frames for the two "fathers" on the ISS, and had them personalized with pictures and talking messages from their respective daughters. One of the "fathers" is Russian cosmonaut Yuri Usachev, pictured below in a still from the RadioShack commercial.



LunaCorp next approached NASA with the concept for the commercial and asked permission to use the American "father" onboard. NASA declined to allow any American to appear in the commercial, claiming that Federal law precluded any commercial use of the likeness of any American astronaut. So, the commercial became an all-Russian affair, with TM-32 pilot Talgat Musabayev presenting the talking picture frame to Yuri Usachev. The resulting commercial aired extensively in the United States in early June, 2001.

The story does not end there, however, as there were additional commercial products aboard the TM-32 taxi flight. As it turns out, both Lego and the magazine Popular Mechanics flew products and banners, and both video and still images were taken. Although stills of both of these events appeared in the media, neither company was able to produce a television commercial similar to that made for RadioShack. Further, Pizza Hut had previously flown a thermally stabilized pizza to ISS and filmed Yuri Usachev eating it. Unfortunately, the Americans on board ISS were involved in the filming, and NASA refused to allow Pizza Hut to create a commercial using the footage. Only RadioShack, by using the Russian "side" of ISS, was able produce a commercial that actually aired (including in Game 4 of the NBA finals).

V. Space Commercialization: Lessons Learned

What lessons can be learn from the attempts at space commercialization over the last two years? A simplistic answer would be that the Russians are acting like capitalists, and the Americans are acting . . . well, like socialists. The real answer is far more complex than that, however, and has far more to do with the economic underpinnings of the two space programs than it does with the philosophical predisposition of either space agency. And therein lies as bizarre paradox and juxtaposition of national priorities.

To get at the fundamental problem, the reader is asked to answer the following questions:

1) Which space agency has leased out an entire space facility for commercial use?

2) Which agency currently hires out its astronauts for commercial activities?

3) Which agency is willing to fly commercial passengers?

4) Which agency is willing to negotiate to attach a commercial facility to "their" side of the ISS?

The answer to all of these questions is the Russian Space Agency. The question of ***why*** is revealed in the following questions:

5) Which agency's budget is $13 billion (answer – NASA);

6) Which agency's budget is $170 million (answer – RSA);

7) For which agency is $20 million real money (answer – RSA).

And that is the true answer to the paradox of the Russians running a capitalist space program and the Americans running a socialist space program. The money on the table to do commercial ventures in space

simply pales in comparison to what Congress gives NASA each year to run a civil space program which is not required to even consider market forces, let alone react to the needs of customers. There is no reason why NASA should care about raising $20 million from flying a "tourist," or a few million here and there from television commercials. It doesn't even show up on the radar screen. For the Russians, however, $20 million is more than ten percent of their entire budget, and gaining a few million at the margin by renting out its astronauts makes excellent business sense.

The problem here also runs deeper than just the economics, however. NASA has two additional problems which preclude it from effectively engaging in commercial space activities. First, NASA is still mired in the "Right Stuff" mentality of the Apollo days, where astronauts were granted near-godlike status. The thought that an astronaut would participate in making a commercial demeans this stature. Second, NASA is made up of excellent scientists, visionary scholars, capable managers, and scores of bureaucrats. NASA does not have any true businessmen or entrepreneurs on the inside. Those that NASA task with commercializing the space program simply are ill-equipped for the task. For the same reason why we would never expect Bill Gates to build a rocket, why do we automatically assume that a rocket scientist can evaluate and implement a business proposal related to the space program? It is the height of hubris on the part of NASA to believe that it can just waive its hands and create qualified businessmen to take NASA in a commercial direction.

VI. Conclusion

Russia has been forced into a commercial mode because of desperation. NASA will not make a similar change unless forced to do so by either economics or an enforceable congressional mandate. Until NASA is forced to deal in a reasonable commercial manner, however, it will see more and more business slip to "Mother Russia," and in the process see its stature diminished far more than it would were it to allow its astronauts to engage in commercial activities.

If the past two years is any indication, the next two years in space commercialization should be exciting. The doors opened by MirCorp, RadioShack, LunaCorp, and most of all, Dennis Tito, cannot all be slammed shut again. Like it or not, NASA is faced with a new reality of space commercialization that it cannot ignore. Actually, it can ignore this new wave of commercialization, but it will do so at its own peril. For if NASA chooses not to participate in the next few rounds of opening space for more business opportunities, it could find its space station surrounded by private condos, and effectively irrelevant. Instead, if it embraces the commercial efforts of the space community, NASA could help create a future in space consistent with Arthur C. Clarke's vision in 2001: A Space Odyssey. It may be 2020 before we see private shuttles flying to private wheeled space stations. But at least, for the first time in a generation, we can point skyward and declare that the High Frontier is open for business. Bring it on!